STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

Development of Statewide Guidelines for Reducing Wildlife Impacts from Wind Energy Development	)))	Docket No. 06-OII-1 Developing Statewide Avian Guidelines

COMMENTS OF THE
CALIFORNIA WIND ENERGY ASSOCIATION
ON REVISED STAFF DRAFT GUIDELINES

The California Wind Energy Association ("CalWEA") appreciates this opportunity to provide written comments on the April 2007 revised staff draft report, "California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development" ("Revised Staff Draft"). The importance to wildlife of achieving the state's greenhouse-gas reduction goals makes it vitally important that these Guidelines not impose arbitrary or unnecessary review requirements on wind projects. Rather, the Guidelines should promote the appropriate level of review for each wind project – sometimes minimal, sometimes extensive -- depending on the characteristics of the site and project in question. These comments are aimed at assisting the Commission's Renewables Committee in achieving that end.

Included with this overview of our comments are our detailed comments within the Revised Staff Draft document, which, as requested by the Committee, propose specific text deletions and insertions. The substance of these text changes, if accepted, should be extended through additional edits to these same sections and should be carried over to other relevant parts of the document. We believe that substantial additional detailed discussion at a workshop is still warranted prior to issuing the next draft, based on our comments and other parties' comments that may be submitted on this draft.

Please note that, despite the extra three weeks of time provided for comment, CalWEA members (who are very busy with project developments) have not been able to thoroughly review these comments as submitted and we may therefore offer further or

refined comments at a later date. We also note that all of our concerns and proposals have been elaborated upon in previous comments.

I. General Comments

The Revised Staff Draft is a substantial improvement over the initial staff draft, in a number of ways, including:

a. its organization is dramatically improved,

b. one of the most problematic aspects of the first staff draft -- the project-specific Science Advisory Committee concept -- has been largely removed,

c. there is less infringement on the authority of the local lead agency,

d. there are fewer rigid statements about what studies and what data are appropriate for use in most all situations, despite a wide variety of site-specific circumstances,

e. similarly, there is greater recognition, compared to the last draft, that there are ways other than intensive field sampling -- for example, scientifically valid correlations -- to characterize and estimate impacts.

While we appreciate that significant improvements have been made, however, we must conclude again that this document's emphasis on a single prescribed course of study puts it at odds with the state's interest in soundly promoting clean energy to help avert the devastating environmental and human health impacts that we can expect from climate change. Whereas the first document was too far from a reasonable document to even attempt to edit it, though, it is possible to make an initial attempt to correct the problems in the Revised Staff Draft. Our attached edits seek to make such an attempt, but much work remains to be done beyond our editing.

II. Specific Comments

As an overview and a guide to the specific edits we have made in the attached document, we have sorted references to these edits within several topics of concern to us in the Revised Staff Draft. However, time and resource constraints limit the focus of our comments primarily to the first 35 pages (through Chapter 2) of the document. The substance of these comments, if accepted, should be reflected more extensively through

additional edits to these same sections and should be carried over to other relevant parts of the document.

Following are brief discussions of the areas of concern to us, along with references to the specific line numbers where we have proposed edits to address the concerns.

A. The Guidelines Should Guide Local Agencies to the Appropriate Level of Review for Each Project

The draft sets forth some "exceptions" to one standard "step-by-step" course of study, but these exceptions are too limited and narrow to guide each project to the course of study that is appropriate given the particular circumstances of its site and the existing information that may be available about that site. These circumstances – which may warrant a greater or lesser level of study than the standard, as applied to the particular issue of concern -- include differences in climate, topography, habitat, proximity to migration routes, bird and bat species present at the site, and existing, scientifically credible information that may already be available to inform decisions at the site. Different circumstances will appropriately lead to different levels of review, study methods, and time periods and durations of study.

The Revised Staff Draft advises the "consistent" application of the Guidelines. Because of the wide variety of circumstances that warrant different study methods, however, what should be "consistent" is not particular studies and methods used, but the *process* for considering which methods are appropriate at a given site. Consistency is also in order for any particular method once it is selected for use (e.g., sampling techniques).

And, yet, the document suggests that the particular methods recommended in the Step-by-Step approach must be followed in order to demonstrate a "good faith effort to develop ... projects ... consistent with the intent of local, state, and federal laws." (See Revised Staff Draft at lines 340-342). If the particular recommended methods are not followed – even if they are not necessary or appropriate in a given situation – the lead agency and project proponent could face an increased exposure to litigation. This is because a project proponent will be presumed NOT to have made a good faith effort to

comply with state and federal laws if he does not use the particular study methods set forth in the Guidelines. As we have noted before, the fact that these Guidelines are stamped "voluntary" is not meaningful because they carry the authoritative weight of the state.

For these reasons, the document's rigid prescriptions are a critical flaw in the document. They turn what could be helpful guidelines into a litigation opportunity for project opponents – who are more likely to be NIMBYs and real estate developers than avian advocates. The document should instead be based on principles and appropriate steps, which will greatly increase the "shelf life" of the document and greatly reduce the chance that it will impose costs with little benefit gained or, in some cases, result in too little or the wrong type of study.

To remedy this problem, and to illustrate a more reasonable process for determining what level of study is appropriate, we have developed a framework of three general categories suggesting different levels of review, along with a category where project development is not advised. (See table in Appendix 1 to these comments.) This framework draws out (for Category 3) an idea that seems to be implicit in the draft (see lines 760, 1346 and 3080): the notion that, where avian impacts can be predicted to fall within the low- to average-range of impacts for wind projects across the state and nation, the intensity and duration of required studies can be reduced. The framework also incorporates an idea we have previously proposed: that certain low-impact or well-studied project areas should be eligible for streamlined environmental review.

This framework is a beginning point only. Within each category, there would be a "decision tree" type of approach to guide each project to the type of studies and methods appropriate to the conditions at hand. We would be glad to assist the Commission in further developing this approach.

In addition to referencing the addition of our Table within the Revised Staff Draft, we made many additional edits to reflect the above approach, rather than the one-size-fits-all-with-limited-exceptions approach in the draft. Substantial further editing would, however, be necessary in combination with a discussion of a decision-tree approach.

Our edits addressing this topic can be found at lines 72, 97-104, 109, 162-167, 187-192, 199, 205-206, 227-228, 248-253, 291, 293-298 (adding proposed streamlined

review for low-impact areas), 338, 358-363, 380-381, 401-404, 410-411, 484 (and subsequent edits to that section), 664, 676, 747 (and subsequent edits to that section), and 779-783. Additionally, some of the edits referenced below also affect this topic area. (Further edits are also included in Chapters 3-5, but not as extensively as in the earlier sections.)

B. The Guidelines Should Recognize that Compliance with the Letter of Wildlife Laws is Not Possible, and Aim Studies at the Level of Information that is Needed to Inform Siting Decisions under CEQA

The document implies that "compliance" with wildlife laws is possible, and that lots of studies and mitigation can bring a project into compliance despite the fact that compliance is not possible with many of these laws because one bird kill is an inexcusable violation. In conflating CEQA and the rigid wildlife laws, this draft -- like the last one – attempts to turn the permitting process into an exercise of very extensive and expensive information gathering that will not be necessary or justified for every project, nor is it likely to significantly reduce avian mortality for most projects.

In exchange for imposing unnecessary levels of review, the document contains one sentence that suggests (lines 110-113) that developers might be shielded from state and federal prosecution if a wildlife law is inadvertently violated at some point over the project's lifetime. But the statement falls far short of a guarantee and, in any case, the state cannot give guarantees about federal enforcement. The document also includes overly broad statements about wildlife laws that are not supported by citations to any provision of law.

Because compliance with rigid wildlife laws is not possible, and because this document cannot offer protection from prosecution, the Guidelines should not prescribe particular courses of study because, as we noted above, a project proponent will be presumed not to have made a good faith effort to comply with state and federal laws if the proponent does not use the particular study methods described. Rather, the guidelines should emphasize the *information that is needed* in a given situation to understand risk *to the degree of specificity that is required to make siting decisions.*

While compliance with state and federal wildlife laws is an obvious concern to developers, the Guidelines should be consistent with, and focus primarily on, compliance

with the state law that governs the siting and permitting of wind projects along with local land use laws: CEQA. In describing how CEQA defines a significant biological impact, the Guidelines purport to quote the CEQA Guidelines [section 15065(a)(1)] but omit an important provision defining a significant impact as one which "substantially reduces the number or restricts the range of an endangered species." The fact is, CEQA does not necessarily consider the loss of a single individual of an endangered species to constitute a significant environmental impact. To be significant under CEQA, the impact must "substantially" reduce the number of a species.

Therefore, the primary objective in predicting impacts at a proposed development site is to determine whether the project will have a significant adverse impact on avian species. The initial focus in pre-permitting assessment should be to determine whether there is enough information to make that determination. The guidelines should address what kind of information is needed to make that determination including species presence, abundance and behavior in the Wind Resource Area (WRA).

If existing information and analysis clearly show that the project will not have a significant adverse impact on a species of concern, then further studies (e.g., more detailed field studies) to more precisely quantify abundance and flight behavior are not necessary. If existing information and analysis are inadequate to show that a project will not have a significant adverse impact on a species of concern, then more detailed field studies may be appropriate to fill in information gaps so that an impact determination can be made.

The edits that we propose in section II.A, above, remedy these problems in part, because they aim to guide each project to an appropriate level of study. These additional edits further address the problems relating to inappropriate prescriptions and references to wildlife laws.

See edits to lines 67, 106-107, 110-111, 157-158, 162-167, 234-235, 291, 302, 304, 310, 311, 313-317, 327, 342, 390-396, 411, 526, 527, 534, 550, 554, 560, 573, 575, 637, 784, 1126, and 1158. See also edits throughout Chapter 2.

C. The Draft Does Not Sufficiently Recognize The Variety Of Ways That Sufficient Credible Evidence About Impacts Can Be Gathered

In a number of places, the Revised Staff Draft is overly prescriptive about the specific methods that are "recommended" for use. (As we have said many times, whatever is "recommended" in these "voluntary" guidelines will become de facto requirements at the local level.) The final Guidelines should recognize that a variety of methods can be used to provide scientifically credible information on various issues of interest. For example:

- although the Step-by-Step approach recommends that bird use counts and acoustical monitoring be used to determine abundance, there are other methods that may be as or more appropriate at a given site (which is recognized in Chapter 3), and some of these studies may not be appropriate at all;

- there is no explicit recognition in the main text that scientifically valid correlations can be made for sites that are not "nearby" – even though, buried in Appendix H, data is presented that shows that using correlated use and mortality data from sites across the country is valid for raptors;

- there is no recognition that scientifically valid extrapolations can be made from seasonal data.[1]

It is very important that these Guidelines recognize the validity of correlation and extrapolation because the ability to use this sound and low-cost technique will increase as more and more comparable data is gathered and compiled across the state, as is envisioned in these Guidelines.

The guidelines should also recognize that certain information that is central to making determinations (e.g., migratory pathways, nesting, flight patterns, relative abundance, etc.) can be obtained from many possible sources: published studies, governmental databases, conservation groups and existing mortality surveys, as well as

[1] See, e.g., "Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments," prepared for the Bonneville Power Administration by WEST, Inc., December 2002. This document, while included in the References section, should be discussed in the Guidelines along with the correlation techniques it addresses.

site-specific field studies. These studies can range from simple site reconnaissance to detailed field studies, possibly including acoustical and radar studies.

These problems are addressed with our edits at the following line locations: 99, 377-379, 431, and 495.

D. Mitigation Should Apply Only to Significant Impacts

The guidelines should recognize that mitigation should apply only to significant impacts. Since some mortality will occur, applicants should not, for example, be required to mitigate for mortality to non-listed MBTA species whose populations will not be significantly affected by the predicted mortality.

Associated edits can be found at the following line locations (and some of those above): 133, 146, 194, and 195.

E. The Post-Construction Monitoring Requirements Are Excessive

In addition to two years of post-construction mortality monitoring (that is, carcass searches), the draft calls for two years of point counts and acoustical monitoring, which adds a huge additional cost with very little benefit.

These and other excessive study requirements are aimed in part at collecting data that will further the understanding of wind impacts on birds and bats. (See, e.g., Revised Staff Draft lines 189-192.) Of course, this is a laudable objective, but imposing costly study requirements on every project is not the appropriate way to obtain this information, nor is it necessary, and it will interfere with the achievement of California's clean energy goals. Instead, this information should be obtained through research at the state and national levels.

This problem is largely addressed through edits listed above, but we call out in particular edits at lines 676, 702, 739, and 747 along with other edits in that section.

F. The Guidelines Should Not Invite the Possibility of Open-Ended Mitigation and the Risk of Monitoring over the Life of a Project

If the Guidelines succeed in directing project developers and lead permitting agencies to the level of study that is appropriate for each site, it should be possible to predict non-significant avian mortality with a reasonable degree of accuracy, or to predict

any significant impacts along with well-defined avoidance and mitigation measures to be incorporated into the project permit. If, despite these reasonable efforts, open-ended mitigation and monitoring provisions are included in the permit, the associated open-ended risk will raise project financing costs or make financing untenable – especially given the already high cost of doing business in California generally.

For the same reason, any "triggers" for additional mitigation, if used at all, should be bounded by a range of possible anticipated impacts to provide developers with upfront certainty regarding project costs. Triggers should not be linked inflexibly to specific actions because that can prevent other means of effective remediation besides the prescribed remedy. Triggers also should not be linked to single events because such events can be one-time, freak occurrences.

Likewise, the adaptive management concept is still in its infancy for use in wind projects, and there are no guidelines or accepted methods for such an approach – which is by its nature open-ended -- for wind projects. Adaptive management for wind projects should therefore be discouraged at this time. I

In particular, the Guidelines should stay away from discussing seasonal shutdowns and turbine relocation as mitigation options. First, seasonal shutdowns have been implemented in just one area – the Altamont – and results regarding effectiveness are not yet in. Second, and more importantly, seasonal shutdowns are highly unlikely to be a feasible mitigation measure. The technique is being tried in the Altamont due to avian fatality levels that are higher than anywhere else in the nation and because energy production is relatively very low in the winter shutdown months, a condition that is fairly unique to that site. The commission should be mindful that even having shutdowns on the table as a potential mitigation option can upset project financing due to the extremely high risk exposure it places on a project. The whole point of the Guidelines is to ensure that projects are not located at sites where avian fatalities are so high that shutdowns would be warranted.

Therefore, all references to open-ended mitigation, monitoring, adaptive management, shutdowns, and unbounded "triggers" should be removed and replaced with text that encourages lead agencies to establish permit terms that provide certainty to developers regarding potential future mitigation and monitoring obligations. Edits

addressing these ends can be found at the following line locations: 351-353, 581, 576, and 635, and in other places referenced elsewhere.

G. Too Little Is Known About Bats to Warrant Extensive Studies and Mitigation

Apart from several listed species of bats, bats are not protected by state or federal laws in the same way as certain species of birds. Some bat species appear to be more susceptible to mortality than birds and other bat species, however little is known to explain this. Therefore, it is likely to be impossible to determine whether a particular wind project will significantly affect bat species until a great deal more research on factors contributing their susceptibility is conducted. Currently, there is no reasonable basis to suspect significant impacts on bat species that would justify mitigation. Wind projects should not be required to mitigate impacts to individual bats in such situations involving non-protected bat species especially if prudent and feasible measures to minimize impacts to other wildlife have been incorporated into site selection and design of a wind project.

Requiring extensive monitoring of bats at all sites to provide information for research purposes is a costly and ineffective substitute for properly designed research efforts. Therefore, the Commission should strike references to extensive bat monitoring and separately promote research into understanding bat populations, behavior and mortality, seeking industry contributions and participation as necessary.

See edits at lines 365-369, 461-465, and 743-744.

H. The Guidelines Should Allow for More Decommissioning Options

The Revised Staff Draft suggests that developers provide financial assurance that decommissioning will occur. However, this assurance can be provided by placing the obligation on property owners, as Kern County requires, which does not entail upfront financial commitments and enables the property owner and the developer to address the issue in their lease arrangement. Associated edits can be found at line 2311.

I. Science Advisory Committee

As stated in section I, we are pleased to see the concept of project-specific Science Advisory Committees eliminated from the Revised Staff Draft. CalWEA has indicated that there may be some merit in the development of a Statewide Science Advisory Committee. However, the role and make-up of such a committee requires considerable thought. As the concept of a statewide SAC is in its infancy, and is in any case unlikely to exist by the time the Guidelines are adopted, it is premature to reference a conceptual SAC in these initial Guidelines.

We therefore suggest striking all references to this entity. Discussions with all stakeholders around the concept should occur after these Guidelines are adopted. Related edits can be found at lines 780 and 1036.

J. The Guidelines Should Not Reference Discredited Reports

The Guidelines continue to reference the 2004 Smallwood-Thelander report despite the conclusions of three independent reviews conducted by the Commission (and three others by CalWEA) that the study is seriously flawed and its conclusions are not supported by the analysis.[2] By citing this study without caveat, the Commission is promoting the use of a study that its own reviewers have established as not credible.

If the reference on line 178 to Energy Commission "products to inform the siting of new wind projects" is solely to this report, or to other efforts that use this report as a foundation, the reference should be eliminated.

K. Additional Comments

Additional comments and edits relating to specific methods and permitting procedures are provided within the text. These comments and edits provide further explanation of why attempting to prescribe particular methods can be quite inappropriate. See comments at lines 415, 433-434, 442, 444, 453-454, 461, 484 (and subsequent edits to that section), 553, 565, 573, 575, 590, 591, 595, 601, 604, 608, 612, 613, 615, 617,

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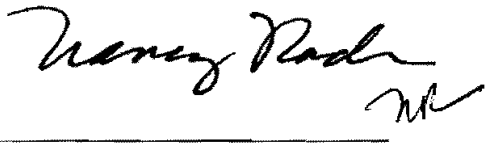
[2] See Energy Commission publication # CEC-500-2006-114, posted December 15, 2006, located at: http://www.energy.ca.gov/pier/final_project_reports/500-04-052.html.

619, 702, 709, 723, 739, and 743-744. Additional detailed edits can be found in Chapters 3-5.

We look forward to continuing to engage in this effort to ensure that the adopted product achieves the Commission's goal of promoting environmentally sound wind energy development in California.

Respectfully submitted,



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May 14, 2007

CALWEA APPENDIX A:
GENERAL FRAMEWORK
FOR DETERMINING APPROPRIATE AVIAN AND BAT STUDY PROTOCOLS

SITE CHARACTERISTICS	CATEGORIES OF SITES			
	Category 1	**Category 2**	**Category 3**	**Category 4**
General Conditions	Federal, state and local parks, wildlife preserves	Site is known to contain or has a high potential to contain federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources, e.g. a migratory bird flyway across the site, or site is adjacent to a Category 1 Site	Sites without or with a low chance of presence of federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources and not in proximity to Category 1.	Same as Category 3 sites, but are either existing wind farms that have the opportunity to re-power or adjacent to existing wind farms that have the opportunity to, expand or infill and which have had a low incidence of bird and bat mortality.
Siting Acceptability for Wind Projects	Not advised	Acceptable if significant impacts are avoided or mitigated	Acceptable if significant impacts are avoided or mitigated	Acceptable if any significant impacts are avoided or mitigated
PROJECT EVALUATION PHASES	**Category 1**	**Category 2**	**Category 3**	**Category 4**
Overall Protocol Characteristics (See Note 1)		Require more intensive or detailed or species-specific studies than Category 3 site to understand potential impacts to federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources.	Require less detailed studies than Category 2 sites. Focus on species-specific studies.	Additional studies, if necessary, focus on any information gaps and specific species known to be of concern, if any. Project may be eligible for streamlined environmental review.
Preliminary Screening Phase	Based on land ownership information identify the presence of land where wind development is not advised.	1) Based on existing information including range maps, element occurrences[2], and other existing information determine the likelihood of	1) Same as Category 2. 2) Same as Category 2. 3) Based on 1 & 2, confirm	If not already in a developed portion of the WRA, evaluate whether habitat and species present in area to be expanded are

SITE CHARACTERISTICS	CATEGORIES OF SITES			
	Category 1	**Category 2**	**Category 3**	**Category 4**
		federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources occurring on or adjacent to project site. 2) Validate likelihood of occurrence with site visit(s) to evaluate habitat suitability for federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources. 3) Based on 1 & 2, confirm Category 2 classification or place in Category 3	Category 3 classification or place in Category 2	consistent with habitat of existing facilities, or nearby adjacent facilities.
Pre-permitting Assessment Phase		1) Depending on specific species possibly present as identified in screening phase, conduct site surveys of appropriate type and duration (up to and possibly exceeding one year) to determine bird and/or bat usage and abundance and significant resources. 2) Studies will be used to characterize and predict impacts and identify possible mitigation.	1) Depending on specific species possibly present as identified in screening phase, conduct appropriate site surveys one year or less focusing only on specific species of concern to determine bird and/or bat usage and abundance and significant resources. 2) Studies will be used to characterize and predict impacts and identify possible mitigation. For CEQA purposes, consider project approval on the basis of a negative	1) Determine whether project and site is consistent with designated low-impact area. 2) Sites with identified sensitivities focus studies on addressing the information gaps for the species of interest, building upon existing studies of those species in the WRA to characterize and predict impacts, and identify possible mitigation. In both cases, for CEQA purposes, consider project

SITE CHARACTERISTICS	CATEGORIES OF SITES			
	Category 1	**Category 2**	**Category 3**	**Category 4**
			declaration or a mitigated negative declaration.	approval on the basis of a categorical exemption for replacement of existing facilities, or a negative mitigation or a mitigated negative declaration.
Operational Monitoring Phase		1) Based on pre-permitting monitoring results, conduct 1-year mortality monitoring and bird and bat usage monitoring to characterize annual conditions. 2) If 1-year monitoring results confirm pre-permitting predictions, and/or show mortality to special status species be within the range of mortality to other non-Altamont California projects, reduce second-year bird and/or bat use mortality monitoring to selected species and seasons where there is still concern, or to areas of continuing concern, e.g. significant avian or bat habitats, or segments of turbine alignments with higher than expected mortality, etc. 3) If 1-year results are above	1) Based on pre-permitting monitoring results, conduct 1 year of mortality monitoring and bird and bat usage monitoring for identified species of concern to characterize annual conditions. Mortality monitoring may be necessary only during particular seasons of concern, such as spring/fall migration periods, during nesting season if the bird and bat species are resident and/or breeding. 2) If 1-year monitoring results show mortality to be within the range of mortality to special status species to other non-Altamont California projects and within acceptable margins of the pre-permitting	For projects with identified sensitivities, conduct operational monitoring based on pre-permitting monitoring results and applicable operational monitoring data, if available, Conduct 1-year mortality monitoring in selected areas during anticipated high risk seasons and/or habitats. Monitoring results will be used to confirm pre-permitting impact predictions and to inform necessary mitigation within pre-determined range.

SITE CHARACTERISTICS	CATEGORIES OF SITES			
	Category 1	Category 2	Category 3	Category 4
		predicted levels continue operational monitoring for second year to better understand factors contributing to risks. 4) Monitoring results will be used to confirm pre-permitting impact predictions and to inform necessary mitigation within pre-determined range.	predictions, and no significant avian or bat resources; a second year of bird and/or bat use monitoring is not necessary. 3) If 1-year results are above predicted levels continue operational monitoring for second year to better understand factors contributing to risks. 4) Monitoring results will be used to confirm pre-permitting impact predictions and to inform necessary mitigation within pre-determined range.	

Note 1. See Guidelines for specific descriptions of standardized monitoring protocols
Note 2. Element occurrences - reported locations of federal and/or state listed endangered or threatened birds, bats, or other significant avian or bat resources from California Natural Diversity Database (CNDDB)

CALIFORNIA GUIDELINES FOR REDUCING IMPACTS TO BIRDS AND BATS FROM WIND ENERGY DEVELOPMENT

DRAFT STAFF REPORT

April 2007
CEC-700-2007-008-SD

Arnold Schwarzenegger, *Governor*

Summary of Comments on Calfiornia Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development - DRAFT REPORT

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CALWEA COMMENTS, APPENDIX B: MARK-UP

EXECUTIVE SUMMARY

Wind energy is expected to play a vital role in meeting California's renewable energy goals, which require that 20 percent of the electricity sold in California come from renewable energy resources by 2010. The California Energy Commission's *2004 Integrated Energy Policy Report Update* recommends a longer-term goal of 33 percent renewable energy by 2020. At the same time California moves to achieve its renewable energy commitments, it must also maintain and protect the state's wildlife resources. Specifically, wind energy development projects in California must avoid, minimize, and mitigate potential impacts to bird and bat populations. *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (Guidelines)* was developed to address these coexisting and sometimes conflicting objectives: to encourage the development of wind energy in the state while minimizing and mitigating harm to birds and bats. Following the *Guidelines* is voluntary, and the document is intended for use throughout the state.

This document is a collaboration of the California Energy Commission (Energy Commission) and the California Department of Fish and Game (CDFG). In its *2005 Integrated Energy Policy Report*, the Energy Commission recommended the development of statewide protocols to address avian impacts from wind development. In 2006, many stakeholder participants at a workshop, "*Understanding and Resolving Bird and Bat Impacts*," collectively requested such guidance. The resulting document provides a science-based approach for assessing the potential impacts that a wind energy project may have on bird and bat species and includes suggested measures to avoid, minimize, and mitigate identified impacts. CDFG and the Energy Commission encourage the use of the *Guidelines* for the biological assessment, mitigation, and monitoring of wind energy development projects and wind turbine repowering projects in California.

The objective of the *Guidelines* is to provide information and protocols for assessing, evaluating, and determining the level of project effects on bird and bat species. The document is organized into five basic steps:

1. Gather preliminary information and conduct site screening.
2. Consider the California Environmental Quality Act (CEQA), wildlife protection laws, and permitting requirements.
3. Collect pre-permitting data using standardized monitoring protocol.
4. Identify potential impacts and mitigation.
5. Collect operations monitoring data using the standardized monitoring protocol.

Information in the *Guidelines* was specifically designed to be flexible to accommodate local and regional concerns. ~~The standardized protocols in the document are adaptable to address the specifics of each site such as frequency and type of bird and bat use, terrain, and availability of scientifically accepted data from nearby sources. Under most circumstances, one year of pre-permitting surveys and two years of operations monitoring data collection~~

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take reasonable steps to

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as a resource for agencies that issue land use permits for wind facilities

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The protocols in the document should be adopted to address the specific conditions at each site, such as frequency and type of bird and bat use, type of terrain, and availability of any existing scientifically credible data, as determined by the lead agency. A general framework of site categories is used to guide project developers and lead agencies to the appropriate level of review at each unique site. Site-specific decisions regarding necessary pre-permitting assessment surveys, operations monitoring, and reporting should be made locally by the project developer and CEQA lead agency in consultation with CDFG, U.S. Fish and Wildlife Service, and local conservation groups.

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~~are recommended. However, depending on decisions made locally in consultation with the CEQA lead agency, CDFG, U.S. Fish and Wildlife Service, and local conservation groups, the data collection efforts may be either abbreviated or expanded to address specific conditions at a project site.~~

California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development does not duplicate or supersede California Endangered Species Act statutes or other legal requirements. This document does not alter a lead agency's obligations under CEQA, nor does it limit the types of studies, mitigation, or alternatives that an agency may decide to require. Because this document complements existing guidance, ~~following these *Guidelines* is important for~~ compliance with CEQA and other local, state, and federal wildlife laws and will facilitate the issuance of required permits for a project, providing a measure of regulatory certainty for wind energy developers.

This document reflects close coordination of the Energy Commission and California Department of Fish and Game and advice from scientists and legal experts, as well as public input from wind energy development companies, counties, conservation groups and other non-governmental organizations, and private citizens. The Energy Commission and CDFG thank all those who participated in the development of these *Guidelines* and encourage lead agencies and all parties interested in the development of California's wind energy resources to use the *Guidelines* as a resource on all future wind energy projects.

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INTRODUCTION

Californians have high expectations for their state's renewable energy programs. On September 26, 2006, Governor Schwarzenegger signed Senate Bill 107 (Simitian and Perata) Chapter 464, Statutes of 2006, requiring that 20 percent of the electricity sold in California come from renewable energy resources by 2010.[1] Additionally, the California Energy Commission's *2004 Integrated Energy Policy Report Update* recommends a longer-term goal of 33 percent renewable energy by 2020. Wind energy is expected to play a vital role in meeting both goals.

Californians have equally high expectations for protection of the state's diverse bird and bat populations. Optimal development of the state's wind energy resources requires adequate measures to avoid, minimize, and mitigate potential impacts to these populations. The voluntary draft *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (Guidelines)* has been developed to help meet both of these expectations and to encourage the development of wind energy in the state while minimizing impacts to birds and bats.

In its *2005 Integrated Energy Policy Report*, the California Energy Commission (Energy Commission) recommended the development of statewide protocols to address avian impacts from wind development. The *Guidelines* effort originated in January of 2006 at the "*Understanding and Resolving Bird and Bat Impacts*" conference in Los Angeles. Many participants at the conference encouraged the Energy Commission and the California Department of Fish and Game (CDFG) to collaborate, with input from all interested parties, to establish voluntary statewide guidelines to promote the development of wind energy in the state, while minimizing impacts to birds and bats.

On May 24, 2006, the Energy Commission adopted an Order Instituting Informational proceeding that assigned the task to the Energy Commission's Renewables Committee.[2] To assist Energy Commission and CDFG staff in this endeavor, the Renewables Committee established a science advisory committee and solicited suggestions from stakeholders on how to incorporate public input into the guidelines development process. As a result, the Energy Commission has hosted numerous public workshops

[1] The Renewable Portfolio Standard was originally placed in statute in 2002 with the passage of Senate Bill 1078 (Sher) Chapter 516, Statutes of 2002, calling for 20 percent renewable energy by 2017. The *Energy Action Plan*, adopted by the California Public Utilities Commission and the California Energy Commission, accelerated the Renewable Portfolio Standard target to achieve 20 percent renewable energy by 2010.

[2] California Energy Commission Docket 06-OII-1. Interested parties can find details on the Order Instituting Informational, the science advisory committee, and summaries of past workshops and comments on the Energy Commission Web site, <www.energy.ca.gov/renewables/06-OII-1/>.

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throughout the state and solicited written comments on draft *Guidelines* to make sure all interested parties have input on development of this document.

Securing Wind Energy Development Permits

~~In California, development of wind energy projects requires land use permits, and state and federal laws and local ordinances regulate the siting and operation of these projects.~~ The California Environmental Quality Act (CEQA), the Planning and Zoning Law, the California Endangered Species Act, Federal Endangered Species Act, and state and federal wildlife protection laws are the primary laws and regulations that govern the process. ~~This document is a tool to facilitate compliance with relevant laws and regulations by recommending methods for conducting site-specific, scientifically sound biological evaluations. Much of the information required to satisfy CEQA is also needed to comply with other state and federal wildlife laws; using the *Guidelines* for standardized guidance on how to collect information on potential bird and bat impacts will facilitate compliance with all of these laws.~~

Status of Wind Energy Research

Bird and bat interactions with wind turbines is an area of active research in this country and internationally. The National Wind Coordinating Committee (NWCC) <www.nationalwind.org>, a diverse collaborative that includes representatives from developers, utilities, environmental and consumer groups, and state and federal government, provides a forum for this research with its Wildlife Workgroup. In California, the Energy Commission's Public Interest Energy Research (PIER) Program supports energy research, development, and demonstration projects to advance science and technology that provide environmentally sound, efficient, and reliable energy sources <www.energy.ca.gov/pier/environmental/index.html>. The Energy Commission has undertaken research efforts that will develop products to inform the siting of new wind energy projects; improve methods to assess impacts of wind development on birds and bats; and evaluate the effectiveness of impact avoidance, minimization, or mitigation measures. Elsewhere in the United States, numerous other private-public research partnerships are underway that will also provide new findings on how to reduce the impacts of wind development on wildlife, including the National Research Energy Laboratory, <www.nrel.gov/wind>, and the Bat and Wind Energy Collaborative (refer to <www.nationalwind.org> for more information).

Purpose of This Document

~~Both wind energy proponents and bird and bat populations will benefit from the consistent application of the *Guidelines* by the counties, cities, and other agencies that permit wind energy projects. This document offers consistent methods to assess bird and bat activity at proposed wind energy sites, design pre- and post-construction monitoring plans, and develop and implement impact avoidance, minimization, and mitigation measures. Using the protocols outlined in the *Guidelines* will promote~~

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In California, development of wind energy projects requires land use permits. Local ordinances regulate the siting and operation of these projects. State and federal laws regulate certain aspects of these projects, including their impacts on special status species.

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This document provides guidance to the project developer and local lead agency in determining the appropriate level of environmental review at a particular site relative to birds and bats. The Guidelines also recommend the use of standardized methods for the particular types of studies that may be conducted, depending on the type of information that is needed, to ensure scientifically sound biological evaluations and to promote comparability of data. Appropriate analysis will provide the information required to inform decision-making under CEQA and state and federal wildlife laws.

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Both wind energy proponents and bird and bat populations will benefit from a level of review that is appropriate for each proposed site. This document offers counties, cities, and other agencies that permit wind energy projects guidance in what to consider when determining, for each site, appropriate pre- and post-construction environmental assessments, monitoring plans and, when necessary, mitigation measures that address significant impacts. The variables include climate, topography, habitats, migration routes, and presence of particular bird and bat species. These variables will lead to different approaches to understanding and addressing the impacts at each site. Appropriate analysis will, in turn, provide the information required to inform decision-making under CEQA and state and federal wildlife laws.

These Guidelines are also intended to promote consistency between particular studies, when they are conducted, so that the results of these studies will be

scientifically sound, cost-effective study designs; produce comparable data among studies within California; allow for analyses of trends and patterns of impacts at multiple sites; and ultimately improve the ability to predict and resolve impacts locally and regionally.

Organization of the Document

The *Guidelines* opens with a step-by-step implementation guide that highlights the recommended process and protocols for successfully securing a permit. The following chapters provide greater detail as well as the scientific background and rationale for the steps necessary in assessing a potential wind energy site, successfully securing permitting for development, and continuing to monitor impacts to birds and bats once the project has launched.

- Chapter 1, "Preliminary Site Screening," discusses the initial actions a developer must take to assess the relative sensitivity of a potential wind energy project site and to determine the kinds of studies that will be required to adequately evaluate the impacts such a project could have on birds and bats.
- Chapter 2, "CEQA, Wildlife Protection Laws, and Permitting Requirements," offers information on impacts and mitigation that can apply both to CEQA and to other wildlife protection laws and makes recommendations to facilitate completion of important milestones throughout the permit application process and the life of the project.
- Chapter 3, "Pre-Permitting Assessment," offers standardized survey methods, protocols, and recommendations for conducting the studies and surveys deemed necessary by preliminary site screening, both for new projects and for repowering.
- Chapter 4, "Assessing Impacts and Selecting Measures for Mitigation," discusses how to assess impact findings discovered during the pre-permitting phase and suggests avoidance and minimization measures to incorporate into the planning and construction of the wind energy development. It also discusses adaptive management and compensatory mitigation.
- Chapter 5, "Operations Monitoring and Reporting," recommends standardized techniques for collecting, interpreting, and reporting bird and bat fatalities and use data once a project has begun operation.

The Future of This Document

This document reflects the current state of knowledge about the interactions of wind turbines with birds and bats. Ongoing and future research and actual experience in constructing and operating wind energy projects inevitably will expand and alter that knowledge and prompt periodic revisions to the *Guidelines*. For questions about this document or to contribute information to the current body of knowledge, please contact Rick York, Senior Biologist at the Energy Commission, <ryork@energy.state.ca.us>.

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gathering information useful to the permitting process.

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preliminary site screening, pre-permitting assessment and operations monitoring inevitably will refine, expand and/or alter that knowledge and appropriate application of these Guidelines. As additional information on bird and bat interaction with wind turbines becomes available, periodic revisions to the Guidelines may be developed.

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A STEP-BY-STEP APPROACH TO IMPLEMENTING THE *GUIDELINES*

This step-by-step guide summarizes the actions project developers should take to assess the impacts a typical wind energy project may have on birds and bats and to avoid, minimize, and mitigate these impacts. The section focuses on:

- Preliminary site screening
- Permitting requirements and compliance with laws
- Pre-permitting assessment methods
- Impact analysis and mitigation
- Operations monitoring

Whereas the other chapters of the *Guidelines* present scientific research and rationale for recommended actions, this section takes a "how to" approach, with the steps arranged in the order they are likely to occur. Each step corresponds to a chapter that provides additional details and background information.

Step 1: Gather Preliminary Information and Conduct Site Screening

Site screening is the first step to assess biological resource issues associated with wind development at a proposed site and to develop a "pre-permitting" study plan. Site screening consists of a reconnaissance field survey and a desktop effort to collect data about the site from databases, reports from nearby projects, agencies, and local experts to evaluate the site's sensitivity and to determine the kinds of studies the developer will have to conduct during the pre-permitting assessment to adequately evaluate a wind energy project's potential impacts to birds and bats. Consultation with the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and other appropriate stakeholders is an important step during this process, yielding valuable information and establishing contacts with key individuals and organizations.

Consider the following questions when assessing the potential for birds and bats (including special-status species) to occur at the site, when making a preliminary evaluation of collision risk, and in designing the pre-permitting studies discussed in Chapter 3.

1. Are any of the following species known or likely to occur on or near the proposed project site ("near" refers to a distance that is within the area used by an animal in the course of its normal movements and activities.):
   - Species listed as federal or state "Threatened" or "Endangered" (or candidates for such listing)?

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, to take reasonable steps to avoid and minimize impacts, and to mitigate any significant impacts.

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experts. Based on the site reconnaissance and review of existing data regarding the site, a preliminary list of species-specific impact questions can be developed, including what species occur at the site and which ones are likely to be affected by the project. The site's sensitivity will serve as the basis for determining what kind of species specific data needs to collected. Identification of specific data needs will than be used to determine the kinds of studies the developer will need.

- Special-status birds or bats?
- Fully protected birds?

2. Is the site near a raptor nest, or are large numbers of raptors known or likely to occur at or near the site during portions of the year?
3. Is the site near important staging or wintering areas for waterfowl, shorebirds, or raptors?
4. Are colonially breeding species (for example, herons, shorebirds, seabirds) known or likely to nest near the site?
5. Is the site likely to be used by birds whose behaviors include flight displays (for example, common nighthawks, horned larks) or by species whose foraging tactics put them at risk of collision (for example, contour hunting by golden eagles)?
6. Does the site or do adjacent areas include habitat features (for example, riparian habitat, water bodies) that might attract birds or bats for foraging, roosting, breeding, or cover?
7. Is the site near a known or potential bat roost?
8. Does the site contain topographical features that could concentrate bird or bat movements (for example, ridges, peninsulas, or other landforms that might funnel bird or bat movement)? Is the site near a known or likely migrant stopover site?
9. Is the site regularly characterized by seasonal weather conditions such as dense fog or low cloud cover that might increase collision risks to birds and bats, and do these events occur at times when birds might be concentrated?

~~The preliminary information gathering phase leads to a critical decision point in project site screening: whether or not a project has the potential for irresolvable problems with bird or bat fatalities. If a project moves forward despite indications that substantial bird or bat fatalities might occur, avoidance and minimization options to reduce the impacts are limited, and the project may require costly, ongoing reassessment of impacts and adjustment of mitigation.~~

Step 2: Consider CEQA, Wildlife Protection Laws, and Permitting Requirements

Permitting for wind energy projects is primarily handled by lead agencies (mostly counties and cities) in accordance with the California Environmental Quality Act (CEQA). In addition to complying with CEQA, lead agencies and project developers ~~must~~ consider the state and federal wildlife protection laws discussed below in assessing and mitigating impacts to birds and bats. The following list of laws includes those most commonly addressed on a wind energy project.

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10. Based on the answers to questions 1 through 5, identify which of these species have been shown to be susceptible to collisions or habitat effects from wind turbines.
11. Identify any of the features (Questions 6 to 10) that might increase the likelihood of increased susceptibility or potential susceptibility to those species that are identified to be susceptible or potentially susceptible to impacts from wind turbines.
12. Identify what specific data needs to be collected to evaluate the susceptibility for each species considered susceptible or potentially susceptible.
13. Identify the appropriate methods (See Step 3) that will provide the specific data needs.

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The preliminary information gathering phase will help developers make initial assessments about the sensitivity of the site, and the likely categorization of the project based on Table A [insert Table A - CalWEA's proposed matrix]. Projects in Category 1 are not advisable. Projects in Category 2 have a greater potential for significant bird or bat fatalities and developers will need to determine whether to pursue the site with the expectation that greater study will be required with possible impact mitigation. Projects in Category 3 have a lower potential for significant impact and will thus require less detailed studies with a focus on species-specific studies. With Category 4 projects, studies will be done only to fill information gaps, if they exist, relating to specific species of concern.

Counties with large low-impact (Category 4) areas should consider taking proactive steps to streamline permitting, as follows:

1. First, make a determination that a designated area has been shown to have less-than-significant impact based on scientifically defensible information on species occurrence and abundance and exposure conditions, including findings from any post-construction monitoring that may have taken place.

2. Second, require site-specific reconnaissance by a qualified biologist to confirm that each proposed project is appropriately placed in the low-impact category.

3. Third, if the proposed site is consistent with the designated low-impact area (and other non-avian issues do not trigger the need for a full EIR), the county could proceed to review it under either an exemption from CEQA, a negative declaration or a mitigation negative declaration, if the site evaluation identifies sensitivities not consistent with the designated low-impact area, or if other unusual circumstances exist that warrant greater scrutiny, the necessary preconstruction studies should be focused on addressing the information gaps for the species of interest and should build upon existing studies of those species in the WRA.

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Certain information that is central to making impact determinations (e.g., migratory pathways, nesting, flight patterns, relative abundance, etc.) can be obtained from many possible sources: published studies, governmental databases, conservation groups and existing mortality surveys, as well as site-specific field studies. [This should be expanded into a discussion of useful information sources.]

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- Special-status birds or bats?
- Fully protected birds?

2. Is the site near a raptor nest, or are large numbers of raptors known or likely to occur at or near the site during portions of the year?
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State Laws

California Environmental Quality Act

- The California Environmental Quality Act governs how California counties, cities, and other government entities evaluate environmental impacts ~~to make~~ discretionary permitting decisions for wind energy development.

Fish and Game Code Wildlife Protection Laws

~~In the broadest sense, CEQA and Fish and Game Code wildlife protection laws require that government agencies develop standards and procedures necessary to maintain, protect, restore, and enhance environmental quality, including fish and wildlife populations and plant and animal communities, and to ensure that projects comply with these laws.~~ Several California Fish and Game Code sections that relate to protection of avian wildlife resources and are relevant to wind energy projects are described below.

- California Endangered Species Act (CESA), 1984 – Fish and Game Code section 2050 et seq.
- Fully Protected Species, Fish and Game Code sections 3511, 4700, 5050, and 5515.
- Migratory Birds, Fish and Game Code section 3513.
- Birds of Prey and Their Eggs, Fish and Game Code section 3503.5.
- Unlawful Sale or Purchase of Exotic Birds, Fish and Game Code section 3505.
- Nongame Birds, Fish and Game Code section 3800 (a).

Federal Laws

The following federal laws apply to protecting wildlife from impacts from wind energy:

- National Environmental Policy Act.
- Federal Endangered Species Act (FESA), 1973, Title 16, U.S. Code section 1531.
- Migratory Bird Treaty Act (MBTA), 1918, Title 16, U.S. Code sections 703 to 712.
- Bald and Golden Eagle Protection Act, 1940, Title 16, U.S. Code section 668.

While CEQA compliance will be the primary focus of the impact assessment for a wind energy project, focusing on CEQA significance alone may not address all of the species and issues that need evaluation and mitigation; impacts prohibited by state and federal wildlife protection laws must be assessed and minimized throughout project construction and operation, whether or not such impacts rise to the level of CEQA significance. Wind energy developers who use the ~~methods described in the *Guidelines*~~ will secure information on impact assessment and mitigation that will apply both to CEQA and to the other wildlife protection laws and will demonstrate a good faith effort

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[new bullet] CEQA is concerned with significant adverse impact, defined in part as one that "substantially reduces the number or restricts the range of an endangered species." CEQA does not necessarily consider the loss of a single individual of an endangered species to constitute a significant environmental impact.

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approach to impact assessment described in the Guidelines, applied appropriately to each site in consultation with the lead agency, and who use recommended protocols for any necessary studies undertaken,

to develop and operate their projects in a fashion that is consistent with the intent of local, state, and federal laws.

Contact land owners, local environmental groups, and state and federal wildlife management agencies such as CDFG and USFWS early in the permitting process to secure critical information on which to base site development decisions and to assess the type and timing of necessary surveys. Agency consultations, issuance of take permits, and securing lands or easements for compensatory mitigation can be lengthy processes; initiating agency contacts early in the permitting process can avoid delays.

~~Structure permit conditions to clearly define the obligations of the operator and to solidly establish triggers for additional mitigation beyond that required upon project approval.~~ Consistent compliance with all terms and conditions of the permit should occur throughout operations monitoring and in fulfilling avoidance, minimization, and mitigation measures.

Step 3: Collect "Pre-Permitting" Data Using Standardized Monitoring Protocols

~~Conduct pre-permitting monitoring for a minimum of one full year to capture seasonal bird composition and relative abundance during all four seasons. The standardized data collection method for diurnal birds is the bird use count, and most projects will also need raptor nest searches. Depending on characteristics of a proposed project site and the bird species potentially affected by the project, additional pre-permitting study methods may be necessary.~~

~~For bats, the standardized recommended method is one year of acoustic monitoring with specialized acoustic systems (for example, AnaBat©, SonoBat©) to determine the presence and activity levels of resident and migratory bats at proposed project sites. Other bat research tools are available to complement the information from acoustic surveys but are not recommended on every project.~~

For nocturnal migratory birds, conduct additional studies as needed if a project potentially poses a risk of collision to migrating songbirds and other species. This document discusses some of the primary tools available to study nocturnal birds (radar, acoustic monitoring, visual monitoring) but does not provide standardized recommendations on duration or frequency of sampling or study design.

Pre-permitting data collection efforts may be reduced if scientifically defensible ~~and applicable data are available from nearby projects or may be expanded if necessary to address particular concerns at a project site.~~ Early consultation with the lead agency and contacts with CDFG, USFWS, local environmental groups, and ~~any~~ other stakeholders with an interest in the ~~project is a crucial~~ step in designing pre-permitting studies and

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Such good faith efforts will be considered by CDFG before taking any enforcement action in the event of a potential violation of a California wildlife protection law.

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[This entire paragraph does not belong in this section; it belongs at the end of Step 4.] Structure permit conditions to clearly define the obligations of the operator and, if significant impacts are predicted, to establish mitigation measures. A range of mitigation measures linked to a range of potential impacts could be included, but the range of mitigation should be clearly bounded to provide developers with cost certainty.

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Table 1 summarizes the pre-permitting assessment phase for sites in various categories depending on the type of project and the biological sensitivity of the site. [Elaborate based on Table.]

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For bats, as little is known about bat populations and their behaviors, and as the value of pre-construction surveys is currently limited, site-specific pre-construction bat studies are presently not recommended. Further research on these issues is needed.

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to develop and operate their projects in a fashion that is consistent with the intent of local, state, and federal laws.

Contact land owners, local environmental groups, and state and federal wildlife management agencies such as CDFG and USFWS early in the permitting process to secure critical information on which to base site development decisions and to assess the type and timing of necessary surveys. Agency consultations, issuance of lake permits, and securing lands or easements for compensatory mitigation can be lengthy processes; initiating agency contacts early in the permitting process can avoid delays.

~~Structure permit conditions to clearly define the obligations of the operator and to solidly establish triggers for additional mitigation beyond that required upon project approval.~~ Consistent compliance with all terms and conditions of the permit should occur throughout operations monitoring and in fulfilling avoidance, minimization, and mitigation measures.

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Pre-permitting data collection efforts may be reduced if scientifically defensible ~~and applicable data are available from nearby projects or may be expanded if necessary to address particular concerns at a project site.~~ Early consultation with the lead agency and contacts with CDFG, USFWS, local environmental groups, and ~~any~~ other stakeholders with an interest in the ~~project is a crucial~~ step in designing pre-permitting studies and

data and information is available, as determined by the lead agency, to inform decision making (e.g., data from other sites that can be correlated to the proposed site with statistical validity. (See, e.g., Erickson et al, 2002.)

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biological impacts of the project can be an important

deciding whether or not modifications to the standardized methods are warranted. The Energy Commission, in consultation with CDFG, proposes to establish a statewide standing science advisory committee that could also provide information to lead agencies seeking additional scientific expertise.

Study Objectives and Design

Development of a pre-permitting study begins with a clear statement of the questions to be answered. Study objectives will vary from site to site, but key issues on most wind energy projects in California will typically include at least the following questions:

- Which species of birds and bats use the project area, and what is their relative abundance throughout the year?
- How much time do birds and bats spend in the risk zone (rotor-swept area), and does this vary by season?
- What is the estimated range of bird and bat fatalities from the project, and how does bird/bat use of the site compare to use data from other wind power sites that also have fatality information?
- What design and mitigation measures could reduce impacts?

Repowering

Repowering refers to modernizing an existing wind resource area by removing old turbines and replacing them with new turbines that are generally larger, taller, and more efficient than the old ones. Pre-permitting studies for repowering involves the same methods as for new projects; however, for repowering projects, data may be available from nearby existing wind projects. If these data are credible, scientifically defensible, and applicable to the repowering site, developers may use the data to reduce the extent of new field studies needed to assess impacts and develop mitigation measures. Evaluate the applicability of the existing data in light of design and operational differences between the old and replacement turbines. Determine the adequacy of this information in consultation with the lead agency, USFWS, CDFG, and other appropriate stakeholders (such as a conservation organization representative).

Birds—Standardized Pre-Permitting Monitoring Protocol

Answering questions about diurnal bird use of a site involves bird use counts to assess bird species composition, seasonal relative abundance, and potential collision risk. This method has been used for many wind energy projects throughout the United States, making it a well-tested technique useful for comparative purposes.

Bird Use Counts

The bird use count (BUC) is a modified point count that involves an observer recording bird detections from a single vantage point for a specified time period.

Page: 23

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 7:25:59 PM

Author: Jim
Subject: Inserted Text
Date: 5/12/2007 7:25:46 PM
that use the project area are potentially susceptible

Author: Jim
Subject: Inserted Text
Date: 5/12/2007 7:24:37 PM
What are the specific impact questions that need to be addressed for this site?
Do these impact questions need be addressed qualitatively and/or quantitatively?

Author: Jim
Subject: Inserted Text
Date: 5/4/2007 7:11:59 AM
these

Author: Jim
Subject: Inserted Text
Date: 5/4/2007 7:16:26 AM
How does bird/bat use of the site compare to use data from other wind power sites that also have fatality information?

Author: Jim
Subject: Cross-Out
Date: 5/4/2007 7:16:34 AM

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 7:30:05 PM

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 7:35:36 PM
Studies should be developed in accordance with the General Framework, Category 4.

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 7:30:18 PM
Data for repower projects

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 7:30:48 PM
or from the project to be repowered.

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 7:33:56 PM

Comments from page 23 continued on next page

deciding whether or not modifications to the standardized methods are warranted. The Energy Commission, in consultation with CDFG, proposes to establish a statewide standing science advisory committee that could also provide information to lead agencies seeking additional scientific expertise.

Study Objectives and Design

Development of a pre-permitting study begins with a clear statement of the questions to be answered. Study objectives will vary from site to site, but key issues on most wind energy projects in California will typically include at least the following questions:

- Which species of birds and bats ~~use the project area~~, and what is their relative abundance throughout the year?
- How much time do birds and bats spend in the risk zone (rotor-swept area), and does this vary by season?
- What is the estimated range of bird and bat fatalities from the project, ~~and how does bird/bat use of the site compare to use data from other wind power sites that also have fatality information?~~
- What design and mitigation measures could reduce impacts?

Repowering

Repowering refers to modernizing an existing wind resource area by removing old turbines and replacing them with new turbines that are generally larger, taller, and more efficient than the old ones. ~~Pre-permitting studies for repowering involves the same methods as for new projects; however, for repowering projects, data~~ may be available from nearby existing wind projects. If these data are credible, scientifically defensible, and applicable to the repowering site, developers may use the data to reduce the extent of new field studies needed to assess impacts and develop mitigation measures. Evaluate the applicability of the existing data in light of design and operational differences between the old and replacement turbines. Determine the adequacy of this information in consultation with the lead agency, USFWS, CDFG, and other appropriate stakeholders (such as a conservation organization representative).

~~Birds—Standardized Pre-Permitting Monitoring Protocol~~

~~Answering questions about diurnal bird use of a site involves bird use counts~~ to assess bird species composition, seasonal relative abundance, and potential collision risk. This method has been used for many wind energy projects throughout the United States, making it a well-tested technique useful for comparative purposes.

Bird Use Counts

The bird use count (BUC) is a modified point count that involves an observer recording bird detections from a single vantage point for a specified time period.

as determined by the lead agency.

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 7:37:36 PM

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 7:48:17 PM

Author: Jim
Subject: Inserted Text
Date: 5/12/2007 7:48:55 PM
The site screening process will determine the site-specific impact questions and data that needs to be collected to answer those questions (see Step 1). If species-specific diurnal bird use information is needed, then bird use counts can be used.

Author: Jim
Subject: Inserted Text
Date: 5/12/2007 7:49:34 PM
If comparable information is not available.

Author: karenh
Subject: Inserted Text
Date: 5/14/2007 2:16:11 PM
(The method of modifying BUC from the standard point counts, by reducing the number of points necessary to get a good statistical analysis from the standard (250) to one per section and increasing the time from 5 or ten minutes to 30 minutes will not result in sound bird use data. Even on a wind farm six square miles in size, that is only six points. Consequently, although increased time is spent at the fewer number of points, increased time does not make up for not having enough points to obtain statistically adequate data (i.e., data adequate from which to draw conclusions). If after such lengthy sampling, conclusions cannot be drawn, the data is not useful. Furthermore, the complexity of annual climate variations, population variations, variations in migration routes and nesting locations (e.g., tri-colored black birds all don't always go to the same place every year), and the off site impacts, such as adverse effects to birds in northern hemisphere or southern hemisphere nesting locations, it would be difficult to impossible to determine the effects of wind farms on any particular species. The complexity of cumulative impact analyses are incredible, particularly when with such few points, the *Guidelines* are requiring that the sampling be done in different weather and different times of day. With small sample sizes, the purpose of such intensive monitoring efforts with the required added variables becomes meaningless, as the data cannot be analyzed conclusively. The actual needs become those of research and experimentation, which go beyond the level of CEQA and NEPA requirements in many cases, as it could take virtually years to obtain enough data. Federal Endangered Species Act and California Endangered Species Act usually require only the "best available data".)

Sampling Duration/Frequency. Conduct BUCs for 30 minutes once a week for one year, covering all daylight hours and weather conditions.

Number/Distribution of Sample Points. Select BUC sample sites at vantage points that offer unobstructed views of the surrounding terrain and that are at least 5,200 feet (1,600 meters) apart, coinciding with proposed turbine sites. Establish sufficient sample points to achieve an average minimum density of 1 to 1.5 sample points every 1 square mile (2.6 square kilometers). Distribute sample points to cover areas of the project site where turbines will be located.

Variables. Record number and species of birds observed, distance from bird to observer, flight height above ground, and environmental variables (for example, wind speed). The surveyor should record locations and behavior at short intervals (for example, 30 seconds), noting behavior such as soaring, contour hunting, and flapping flight.

Metrics. Record bird use at rotor-swept area height per 30-minute count and bird use per 30-minute count per a defined area.

Raptor Nest Searches

Raptor nest searches provide information for micrositing decisions, to establish an appropriately sized non-disturbance buffer around the nesting territory, and to develop compensatory mitigation measures, if needed. Consult with the USFWS, CDFG, raptor biologists, and appropriate stakeholders to establish which species to search for and to develop the site-specific survey protocol.

Search Area. Conduct searches for raptor nests or raptor breeding territories on projects with potential for impacts to raptors in suitable habitat during the breeding season within a range of ~~0.5 to 3 miles (0.8 to 4.8 kilometers) from~~ proposed turbine locations. Use the larger search radii for wide-ranging species such as bald or golden eagles if they are known or likely to nest within 3 miles (4.8 kilometers) or for known or likely red-tailed hawk nests within 2 miles (3.2 kilometers) of the proposed turbine sites. Reduce the search area for species with smaller home ranges (for example, American kestrel) or for species that generally stay within the forest canopy and are unlikely to venture far into the open terrain of a wind resource area (for example, Coopers' hawk, spotted owl, and some species of small owls).

Search Protocol. Conduct nest surveys from the ground ~~or air, using helicopters if possible~~ for large and inaccessible areas and in open country such as grassland or desert. Avoid approaching the nest too closely to minimize disturbance, particularly when surveying from helicopters. Use existing survey protocol (refer to <www.dfg.ca.gov/hcpb/species/stds_gdl/survmonitr.shtml>) for special-status raptor species, including Swainson's hawk, northern goshawk, bald eagle, burrowing owl, and northern spotted owl.

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Author: Jim
Subject: Inserted Text
Date: 5/1/2007 9:23:19 AM
Often time this information can be obtained from the literature. It may be more appropriate to group species by habits e.g. ground nesting, etc.

Author: Jim
Subject: Cross-Out
Date: 5/1/2007 9:21:03 AM

Author: Jim
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Date: 5/1/2007 9:20:56 AM
proposed

Author: Jim
Subject: Inserted Text
Date: 5/1/2007 9:21:12 AM
within the

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 8:27:31 PM
Meaningful comparisons of rotor-swept data can best be obtained if data are stratified according to height of the turbine and rotor diameter, topographical location, level, sloping, and ridgetop.

Author: karenh
Subject: Inserted Text
Date: 5/12/2007 8:38:25 PM
[We concur that raptor nest searches should be done on the project site or along public roadways. However, extensive limitations exist to searching for raptor nests off the project site when the projects are largely on private property and surrounded by private property. Unless a particular species is colonial nesting or the project site is near extensive cliffs or riparian areas which avail good raptor nesting habitat, the number of nests nearby is not necessarily an indication of risk unless the project site is within a migratory route. Aerial surveys are suggested, but it is believed that finding ground nesting raptors in the desert would be difficult. Furthermore, flight elevation limitations exist on and near wind farms to prevent accidents; consequently, aerial surveying methods have their limitations.]

Author: Nancy
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as determined by the lead agency.

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 8:41:19 PM

Author: Nancy

Comments from page 24 continued on next page

Sampling Duration/Frequency. Conduct BUCs for 30 minutes once a week for one year, covering all daylight hours and weather conditions.

Number/Distribution of Sample Points. Select BUC sample sites at vantage points that offer unobstructed views of the surrounding terrain and that are at least 5,200 feet (1,600 meters) apart, coinciding with proposed turbine sites. Establish sufficient sample points to achieve an average minimum density of 1 to 1.5 sample points every 1 square mile (2.6 square kilometers). Distribute sample points to cover areas of the project site where turbines will be located.

Variables. Record number and species of birds observed, distance from bird to observer, flight height above ground, and environmental variables (for example, wind speed). The surveyor should record locations and behavior at short intervals (for example, 30 seconds), noting behavior such as soaring, contour hunting, and flapping flight.

Metrics. Record bird use of rotor-swept area height per 30-minute count and bird use per 30-minute count per a defined area.

Raptor Nest Searches

Raptor nest searches provide information for micrositing decisions, to establish an appropriately sized non-disturbance buffer around the nesting territory, and to develop compensatory mitigation measures, if needed. Consult with the USFWS, CDFG, raptor biologists, and appropriate stakeholders to establish which species to search for and to develop the site-specific survey protocol.

Search Area. Conduct searches for raptor nests or raptor breeding territories on projects with potential for impacts to raptors in suitable habitat during the breeding season within a range of ~~0.5 to 3 miles (0.8 to 4.8 kilometers) from~~ proposed turbine locations. Use the larger search radii for wide-ranging species such as bald or golden eagles if they are known or likely to nest within 3 miles (4.8 kilometers) or for known or likely red-tailed hawk nests within 2 miles (3.2 kilometers) of the proposed turbine sites. Reduce the search area for species with smaller home ranges (for example, American kestrel) or for species that generally stay within the forest canopy and are unlikely to venture far into the open terrain of a wind resource area (for example, Coopers' hawk, spotted owl, and some species of small owls).

Search Protocol. Conduct nest surveys from the ground ~~or air, using helicopters if possible~~ for large and inaccessible areas and in open country such as grassland or desert. Avoid approaching the nest too closely to minimize disturbance, particularly when surveying from helicopters. Use existing survey protocol (refer to <www.dfg.ca.gov/hcpb/species/stds_gdl/survmonitr.shtml>) for special-status raptor species, including Swainson's hawk, northern goshawk, bald eagle, burrowing owl, and northern spotted owl.

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Date: 6/12/2007 8:41:11 PM
T, if possible,

Bats—Standardized Pre-Permitting Monitoring Protocol

Duration of Monitoring. Conduct acoustic monitoring ~~at all sites for one year, except in~~ areas characterized by cold winters where bats are absent during the coldest months (higher elevations and portions of northern California). ~~Consult with bat experts, CDFG, and USFWS before reducing acoustic monitoring during any portion of the one-year monitoring period.~~

Number and Distribution of Monitoring Stations. Place bat detection systems at 100 feet (30 meters) above the ground and at ground level. Establish stations to cover the project area as completely as possible and to encompass diverse terrain and habitats. Try to maintain a density of at least 1 to 1.5 acoustic monitoring stations every 1 square mile (2.5 square kilometers). Logistical constraints (location of existing meteorological towers and roads) will limit the number of potential monitoring sites, so this density of monitoring stations may not be achievable on all projects.

Data Collection and Analysis. Monitor all night and at dusk and dawn. Conduct analysis of the data on a subset of the recordings by screening data to look for spikes of activity, with the remainder stored for later analysis if warranted. Consult with a bat biologist with experience in acoustic analysis and with CDFG and USFWS before making decisions on the level of effort needed for screening and analyzing the pre-permitting acoustic data.

Metrics. Record total bat passes and mean passes per detector night ~~and per detector~~ hour (excluding nights with measurable precipitation).

~~*Exceptions to Standardized Pre-Permitting Monitoring Protocols—Birds and Bats*~~

~~Certain situations warrant exceptions to the standardized monitoring protocol; the burden of proving that an exception is appropriate and applicable is on the stakeholder attempting to justify the exception.~~ Justify birds and bats separately when considering ~~an exception. When deciding whether or not to deviate from the standardized protocols,~~ consult with the CEQA lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as conservation organization representatives) for consideration of the appropriate ~~deviation~~.

When Less Monitoring May Be Appropriate

Less monitoring may be appropriate if scientifically defensible data from previous monitoring activities are already available from nearby, similar projects. Factors to consider in assessing those data include:

- Whether the field data were collected using a credible sample design.
- ~~Where~~ the data were collected ~~in relation~~ to the proposed site.

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Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 8:47:03 PM

Author: Nancy
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Date: 5/12/2007 8:48:58 PM
based on the presence of bat species of concern at the site, in consultation with the lead agency. Acoustic monitoring may not be needed

Author: karenh
Subject: Inserted Text
Date: 5/12/2007 8:48:42 PM
[A year's length of monitoring for bats is extensive for a large wind farm. First, before intensive monitoring is implemented, some determination of the potential presence of bat species of concern should be conducted.]

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 8:47:48 PM

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 8:49:30 PM
In rare instances when acoustic monitoring is used, the protocol below may be considered.

Author: Nancy
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Date: 5/12/2007 8:56:26 PM

Author: Nancy
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Date: 5/12/2007 9:04:05 PM
Different Levels of

Author: Nancy
Subject: Inserted Text
Date: 5/13/2007 10:53:25 PM
[The concept of "exceptions" should be removed throughout the document in favor of a category approach, and a decision-tree analysis of information needs within each category. Scientifically valid reasons, practical and feasibility reasons, site-specific conditions, either physical or biological, are among the many valid reasons that could exist for modifying the proposed guideline protocols. Consequently, while we have attempted to partially salvage this section, the entire section should be reconceived.]

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 9:07:55 PM

Author: Jim
Subject: Cross-Out
Date: 5/4/2007 7:25:41 AM

Comments from page 25 continued on next page

Bats—Standardized Pre-Permitting Monitoring Protocol

Duration of Monitoring. Conduct acoustic monitoring ~~at all sites for one year, except~~ in areas characterized by cold winters where bats are absent during the coldest months (higher elevations and portions of northern California). ~~Consult with bat experts, CDFG, and USFWS before reducing acoustic monitoring during any portion of the one-year monitoring period.~~

Number and Distribution of Monitoring Stations. Place bat detection systems at 100 feet (30 meters) above the ground and at ground level. Establish stations to cover the project area as completely as possible and to encompass diverse terrain and habitats. Try to maintain a density of at least 1 to 1.5 acoustic monitoring stations every 1 square mile (2.5 square kilometers). Logistical constraints (location of existing meteorological towers and roads) will limit the number of potential monitoring sites, so this density of monitoring stations may not be achievable on all projects.

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Metrics. Record total bat passes and mean passes per detector night and per detector hour (excluding nights with measurable precipitation).

~~Exceptions to Standardized Pre-Permitting Monitoring Protocols—Birds and Bats~~

~~Certain situations warrant exceptions to the standardized monitoring protocol; the burden of proving that an exception is appropriate and applicable is on the stakeholder attempting to justify the exception.~~ Justify birds and bats separately when considering ~~an exception. When deciding whether or not to deviate from the standardized protocols,~~ consult with the CEQA lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as conservation organization representatives) for consideration of the appropriate ~~deviation~~.

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Less monitoring may be appropriate if scientifically defensible data from previous monitoring activities are already available from nearby, similar projects. Factors to consider in assessing those data include:

- Whether the field data were collected using a credible sample design.
- Where the data were collected ~~in relation~~ to the proposed site.

Author: Jim
Subject: Inserted Text
Date: 5/12/2007 9:09:53 PM
Depending upon the type of site and site-specific conditions, the impact questions to be considered, and the availability of existing acceptable data or information on bird use, more or less than a full year of monitoring my be appropriate.

Author: Nancy
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information needs and methods to obtain that information. In doing so,

Author: Jim
Subject: Inserted Text
Date: 5/1/2007 9:24:05 AM
for

Author: Nancy
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Date: 5/12/2007 9:13:14 PM

Author: Nancy
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methods

Author: Jim
Subject: Inserted Text
Date: 5/12/2007 9:16:09 PM
, e.g. with Category 3 projects,

Author: Jim
Subject: Inserted Text
Date: 5/4/2007 7:35:00 AM
locations or

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 9:28:25 PM
, or from the same site that is to be repowered

Author: Jim
Subject: Inserted Text
Date: 5/12/2007 9:17:18 PM
Will this data answer the impact questions associated with the species of interest found at the site?

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 9:20:30 PM

Comments from page 25 continued on next page

Bats—Standardized Pre-Permitting Monitoring Protocol

Duration of Monitoring. Conduct acoustic monitoring ~~at all sites for one year, except~~ in areas characterized by cold winters where bats are absent during the coldest months (higher elevations and portions of northern California). ~~Consult with bat experts, CDFG, and USFWS before reducing acoustic monitoring during any portion of the one-year monitoring period.~~

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Metrics. Record total bat passes and mean passes per detector night and per detector hour (excluding nights with measurable precipitation).

~~Exceptions to Standardized Pre-Permitting Monitoring Protocols—Birds and Bats~~

~~Certain situations warrant exceptions to the standardized monitoring protocol; the burden of proving that an exception is appropriate and applicable is on the stakeholder attempting to justify the exception.~~ Justify birds and bats separately when considering ~~an exception. When deciding whether or not to deviate from the standardized protocols,~~ consult with the CEQA lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as conservation organization representatives) for consideration of the appropriate ~~deviation~~.

When Less Monitoring May Be Appropriate

Less monitoring may be appropriate if scientifically defensible data from previous monitoring activities are already available from nearby, similar projects. Factors to consider in assessing those data include:

- Whether the field data were collected using a credible sample design.
- ~~Where~~ the data were collected ~~in relation~~ to the proposed site.

Author: Nancy
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Author: Jim
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Date: 5/12/2007 9:21:07 PM
at a site with conditions similar

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 9:18:28 PM
Whether

- If the existing data reflect comparable turbine type, layout, habitat, physical features, and winds.
- Whether the data are scientifically defensible ~~and still relevant~~.

For example, reduced pre-permitting monitoring might be appropriate for a project surrounded by or near an existing wind development project that had been studied sufficiently and for which there is little uncertainty as to the level of impact. Such decisions require expert biological input because short distances and slight topographical, wind, or habitat changes within or adjacent to the project can make important differences regarding bird and bat impacts, as can the types of turbines. Consultation with the lead agency, USFWS, CDFG, biologists with specific expertise, and ~~other appropriate stakeholders (such as a conservation organization representative)~~ is recommended when considering whether existing data are adequate. ~~This consultation will help identify potentially overlooked issues that could cause delays in project development.~~

When More Monitoring May Be Appropriate

High levels of bird and/or bat use or large uncertainties regarding bird and bat use of the proposed site may need additional study beyond one year to help understand and formulate ways to reduce the number of fatalities. For example, an unstudied area ~~destined to be a new, large wind resource area~~ might warrant more than one year of pre-permitting monitoring. A site with high potential for impacts to special-status species – such as a new wind project proposed within critical habitat for the Threatened marbled murrelet – might warrant multi-year studies. Sites with high raptor use may require more than one year of monitoring to more clearly understand raptor use of the site and determine the potential to reduce impacts through micrositing.

Step 4: Assess Impacts and Select Mitigation

To comply with CEQA, lead and responsible agencies make estimates of potential fatalities and risk to individual species and populations to determine ~~"significance"~~ and to develop avoidance, minimization, and mitigation requirements. Address the following three categories of impacts to conduct an adequate CEQA analysis of impacts.

"Direct" impacts refer to bird and bat collisions with wind turbine blades, meteorological towers, and guy wires. Determine direct impacts by reviewing all of the pre-permitting data to evaluate which species might collide with turbines and which non-biological factors (such as topographic, weather, and turbine design features) might contribute to this risk. ~~Make a risk assessment to determine whether overall avian and bat fatality rates are low, moderate, or high relative to other projects. For all quantification of risk and fatality estimates, use a uniform metric of bird or bat fatalities per megawatt (MW) of installed capacity per year. Refer to Appendix H for a discussion of raptor use and fatality data from studies at existing wind resource areas.~~

Page: 26

Author: Nancy
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Author: Nancy
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Date: 5/12/2007 9:29:12 PM
repower or new

Author: Jim
Subject: Note
Date: 5/1/2007 9:27:05 AM
implies requirement to involve all

Author: Jim
Subject: Inserted Text
Date: 5/1/2007 9:25:42 AM
/or

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 9:29:43 PM

Author: Jim
Subject: Inserted Text
Date: 5/12/2007 9:32:44 PM
for species considered potentially susceptible

Author: Jim
Subject: Inserted Text
Date: 5/4/2007 7:39:38 AM
for species potentially susceptible to wind project effects

Author: Jim
Subject: Inserted Text
Date: 5/4/2007 7:40:43 AM
the nature of the impacts

Author: Nancy
Subject: Cross-Out
Date: 5/12/2007 9:37:38 PM

Author: Nancy
Subject: Inserted Text
Date: 5/12/2007 9:37:35 PM
designated

Author: Jim
Subject: Note
Date: 5/1/2007 9:26:09 AM
define high potential

Author: Jim

Comments from page 26 continued on next page

- If the existing data reflect comparable turbine type, layout, habitat, physical features, and winds.
- Whether the data are scientifically defensible ~~and still relevant~~.

For example, reduced pre-permitting monitoring might be appropriate for a project surrounded by or near an existing wind development project that had been studied sufficiently and for which there is little uncertainty as to the level of impact. Such decisions require expert biological input because short distances and slight topographical, wind, or habitat changes within or adjacent to the project can make important differences regarding bird and bat impacts, as can the types of turbines. Consultation with the lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as a conservation organization representative) is recommended when considering whether existing data are adequate. ~~This consultation will help identify potentially overlooked issues that could cause delays in project development.~~

When More Monitoring May Be Appropriate

High levels of bird and/or bat use or large uncertainties regarding bird and bat use of the proposed site may need additional study beyond one year to help understand and formulate ways to reduce the number of fatalities. For example, an unstudied area ~~destined~~ to be a new, large wind resource area might warrant more than one year of pre-permitting monitoring. A site with high potential for impacts to special-status species—such as a new wind project proposed within critical habitat for the threatened marbled murrelet—might warrant multi-year studies. Sites with high raptor use may require more than one year of monitoring to more clearly understand raptor use of the site and determine the potential to reduce impacts through micrositing.

Step 4: Assess Impacts and ~~Select~~ Mitigation

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Date: 5/12/2007 9:38:35 PM
especially for species potentially susceptible to significant impacts and where there is a relationship between bird use and mortality and a quantification of this mortality is required.

Author: Jim
Subject: Cross-Out
Date: 5/4/2007 7:45:55 AM

Author: Jim
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Date: 5/4/2007 7:46:03 AM
Identify Potential

Author: Jim
Subject: Inserted Text
Date: 5/4/2007 7:46:08 AM
Measures

Author: Jim
Subject: Inserted Text
Date: 5/4/2007 7:45:51 AM
Potential

Author: Nancy
Subject: Cross-Out
Date: 5/13/2007 9:07:07 AM

Author: Nancy
Subject: Inserted Text
Date: 5/13/2007 9:07:00 AM
whether such fatalities are biologically significant

Author: Jim
Subject: Inserted Text
Date: 5/13/2007 9:21:09 AM
that are to be implemented during operation of the facility. It is vitally important that the pre-permitting impact assessment be used to determine the Operational Monitoring protocols that will be used to confirm the impact predictions. A qualitative or quantitive risk assessment should be conducted to determine whether overall avian and bat fatality rates are low, moderate, or high relative to other projects (See [revised] Chapter 4).

Author: Jim
Subject: Inserted Text
Date: 5/4/2007 7:44:41 AM
potential

Author: Jim
Subject: Cross-Out
Date: 5/4/2007 7:55:16 AM

Author: Jim
Subject: Inserted Text
Date: 5/13/2007 9:22:16 AM
For some situations, a qualitative prediction of whether the impacts are above, below or within the range for similar California species may be sufficient, as well as a determination of whether direct impacts are likely to be biologically significant. In other situations, a quantification of the amount of predicted mortality may be necessary. For all quantification of risk and fatality estimates, use a uniform metric of bird or bat fatalities (per megawatt of installed capacity per year). (See Appendix H for a discussion of raptor use and fatality data from studies at existing wind resource areas.)

Comments from page 26 continued on next page

- If the existing data reflect comparable turbine type, layout, habitat, physical features, and winds.
- Whether the data are scientifically defensible ~~and still relevant.~~

For example, reduced pre-permitting monitoring might be appropriate for a project surrounded by or near an existing wind development project that had been studied sufficiently and for which there is little uncertainty as to the level of impact. Such decisions require expert biological input because short distances and slight topographical, wind, or habitat changes within or adjacent to the project can make important differences regarding bird and bat impacts, as can the types of turbines. Consultation with the lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as a conservation organization representative) is recommended when considering whether existing data are adequate. ~~This consultation will help identify potentially overlooked issues that could cause delays in project development.~~

When More Monitoring May Be Appropriate

High levels of bird and/or bat use or large uncertainties regarding bird and bat use of the proposed site may need additional study beyond one year to help understand and formulate ways to reduce the number of fatalities. For example, an unstudied area ~~destined~~ to be a new, large wind resource area might warrant more than one year of pre-permitting monitoring. A site with high potential for impacts to special-status species—such as a new wind project proposed within critical habitat for the Threatened marbled murrelet—might warrant multi-year studies. Sites with high raptor use may require more than one year of monitoring to more clearly understand raptor use of the site and determine the potential to reduce impacts through micrositing.

Step 4: Assess Impacts and ~~Select~~ Mitigation

To comply with CEQA, lead and responsible agencies make estimates of potential fatalities and risk to individual species and populations to determine ~~"significance"~~ and to develop avoidance, minimization, and mitigation requirements. Address the following three categories of impacts to conduct an adequate CEQA analysis of impacts.

"Direct" impacts refer to bird and bat collisions with wind turbine blades, meteorological towers, and guy wires. Determine direct impacts by reviewing all of the pre-permitting data to evaluate which species might collide with turbines and which non-biological factors (such as topographic, weather, and turbine design features) might contribute to this risk. ~~Make a risk assessment to determine whether overall avian and bat fatality rates are low, moderate, or high relative to other projects. For all quantification of risk and fatality estimates, use a uniform metric of bird or bat fatalities per megawatt (MW) of installed capacity per year. Refer to Appendix H for a discussion of raptor use and fatality data from studies at existing wind resource areas.~~

"Indirect" impacts refer to disturbance of bird and bat populations and subsequent displacement or avoidance of the site and disruption to migratory or movement patterns. Displacement and site avoidance impacts have not been well documented at wind energy projects in California. Most of the information on indirect impacts for projects in the United States comes from studies on grassland and shrub-steppe breeding songbirds and other open country birds. If the proposed project has potential for indirect impacts to birds or bats, use before after/control impact or impact gradient study design, discussed in Chapter 3, to determine if wind turbines are affecting bird or bat density or behavior.

"Cumulative" impact assessments involve a determination of whether or not a project's incremental impacts, combined with the impacts of other projects, are cumulatively considerable. Take the following steps to conduct an adequate CEQA analysis of cumulative impacts on special-status bird or bat species:

1. ~~Identify~~ the species that warrant a cumulative impact analysis.
2. Establish an appropriate geographic scope for the analysis.
3. Compile a summary list of past, present, and reasonably foreseeable future projects within the specified geographical range that could impact the species.
4. Assess the impacts to the relevant bird or bat species from past, present, and future projects.
5. Make a determination regarding the significance of the project's contributions to cumulative significant impacts to the species.

Impact Avoidance and Minimization

~~Consider the following~~ elements in site selection and turbine layout and in developing infrastructure for the facility:

- Minimize fragmentation and habitat disturbance.
- Establish buffer zones to minimize collision hazards.
- ~~Reduce impacts with appropriate turbine design and layout~~
- Reduce artificial habitat for prey at turbine base area.
- Avoid lighting that attracts birds and bats.
- Minimize power line impacts.
- Avoid guy wires.
- Decommission non-operational turbines.

Compensation

Compensation is ~~a common~~ way to mitigate or offset impacts, including cumulative impacts that cannot be avoided or minimized in other ways. ~~Development of effective~~ compensation measures should involve the ~~CEQA lead agency,~~ project proponent, wildlife agencies, and the affected public stakeholders through the CEQA process. Lead

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nearby

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During the site screening process or at the beginning of pre-permitting monitoring assessment, identify

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, such as a wind resource area

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biological

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Based on the impact predictions, consider

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around nests

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This is too vague.

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"Indirect" impacts refer to disturbance of bird and bat populations and subsequent displacement or avoidance of the site and disruption to migratory or movement patterns. Displacement and site avoidance impacts have not been well documented at wind energy projects in California. Most of the information on indirect impacts for projects in the United States comes from studies on grassland and shrub-steppe breeding songbirds and other open country birds. If the proposed project has potential for indirect impacts to birds or bats, use before after/control impact or impact gradient study design, discussed in Chapter 3, to determine if wind turbines are affecting bird or bat density or behavior.

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1. ~~Identify~~ the species that warrant a cumulative impact analysis.
2. Establish an appropriate geographic scope for the analysis.
3. Compile a summary list of past, present, and reasonably foreseeable future projects within the specified geographical range that could impact the species.
4. Assess the impacts to the relevant bird or bat species from past, present, and future projects.
5. Make a determination regarding the significance of the project's contributions to cumulative significant impacts to the species.

Impact Avoidance and Minimization

~~Consider~~ the following elements in site selection and turbine layout and in developing infrastructure for the facility:

- Minimize fragmentation and habitat disturbance.
- Establish buffer zones to minimize collision hazards.
- ~~Reduce impacts with appropriate turbine design and layout~~
- Reduce artificial habitat for prey at turbine base area.
- Avoid lighting that attracts birds and bats.
- Minimize power line impacts.
- Avoid guy wires.
- Decommission non-operational turbines.

Compensation

Compensation is ~~a common~~ way to mitigate or offset impacts, including cumulative impacts that cannot be avoided or minimized in other ways. Development of effective compensation measures should involve the ~~CEQA lead agency~~, project proponent, wildlife agencies, and the affected public stakeholders through the CEQA process. Lead

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significant, biological

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one

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, if deemed necessary by the CEQA lead agency,

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It is important that project applicants know, at the time of permitting, all potential mitigation and compensation requirements so that project investors can anticipate all potential mitigation costs and the project can move forward.

agencies should ~~establish the terms and~~ funding commitments for compensation prior to issuing final project permits. Early planning for compensatory mitigation provides project developers with upfront information of mitigation costs and assurances of adequate funding to fulfill the required mitigation program. Triggers for additional compensatory mitigation beyond that required at project approval should be well defined and feasible to implement, so the permittee will have an understanding of any potential future mitigation requirements.

Establish a biologically meaningful nexus between the ~~level~~ of impact and the amount of compensatory mitigation required. Unlike habitat impacts, in which an acre of habitat lost can be compensated with an appropriate number of acres of habitat restored or protected, no obvious compensation ratio will offset bird and bat collisions with wind turbines. Therefore, consult with CDFG, USFWS, and species experts in the development of site-specific ratios ~~and fees to use~~ in establishing compensation formulae. The compensation ~~must~~ be biologically based, reasonable, and provide certainty in terms of the funds that will be expended and certainty that the mitigation will continue to provide biological resource value over the life of the project. Consider the following list of potential options in developing compensatory mitigation:

- ~~Offsite~~ conservation and protection of essential habitat
  - Nesting and breeding areas
  - Foraging habitat
  - Roosting or wintering areas
  - Migratory rest areas
  - Habitat corridors and linkages
- ~~Offsite~~ conservation and habitat restoration
  - Restored habitat function
  - Increased carrying capacity
- ~~Offsite~~ habitat enhancement
  - Predator control programs
  - Exotic/invasive species removal

Compensation ~~typically involves~~ purchase of land through fee title or purchase of conservation easements or other land conveyances and the permanent protection of the biological resources on these lands. The land or easements can either consist of a newly established, project-specific purchase or be part of a well-defined and established conservation program, such as a mitigation bank. Mitigation banks and conservation programs ~~must be~~ consistent with the following components of CDFG's official 1995 policy on mitigation programs:

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therefore establish well-defined terms along with any

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, if any,

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or

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should strive to

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for significant biological impacts, which may occur offsite or onsite (e.g., predator control programs and invasive species removal can be effective onsite)

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agencies should ~~establish the terms and~~ funding commitments for compensation prior to issuing final project permits. Early planning for compensatory mitigation provides project developers with upfront information of mitigation costs and assurance of adequate funding to fulfill the required mitigation program. Triggers for additional compensatory mitigation beyond that required at project approval should be well defined and feasible to implement, so the permittee will have an understanding of any potential future mitigation requirements.

Establish a biologically meaningful nexus between the level of impact and the amount of compensatory mitigation required. Unlike habitat impacts, in which an acre of habitat lost can be compensated with an appropriate number of acres of habitat restored or protected, no obvious compensation ratio will offset bird and bat collisions with wind turbines. Therefore, consult with CDFG, USFWS, and species experts in the development of site-specific ratios ~~and~~ fees to use in establishing compensation formulae. The compensation ~~must~~ be biologically based, reasonable, and provide certainty in terms of the funds that will be expended and certainty that the mitigation will continue to provide biological resource value over the life of the project. Consider the following list of potential options in developing compensatory mitigation:

- ~~Offsite~~ conservation and protection of essential habitat
  - Nesting and breeding areas
  - Foraging habitat
  - Roosting or wintering areas
  - Migratory rest areas
  - Habitat corridors and linkages
- ~~Offsite~~ conservation and habitat restoration
  - Restored habitat function
  - Increased carrying capacity
- ~~Offsite~~ habitat enhancement
  - Predator control programs
  - Exotic/invasive species removal

Compensation ~~typically involves~~ purchase of land through fee title or purchase of conservation easements or other land conveyances and the permanent protection of the biological resources on these lands. The land or easements can either consist of a newly established, project-specific purchase or be part of a well-defined and established conservation program such as a mitigation bank. Mitigation banks and conservation programs ~~must be~~ consistent with the following components of CDFG's official 1995 policy on mitigation programs:

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could involve

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Lead agencies should consider whether...

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are

- The mitigation site must provide for the long-term conservation of the target species and its habitat.
- The site must be large enough to be ecologically self-sustaining and/or part of a larger conservation strategy.
- The site must be permanently protected through fee title and/or a conservation easement.
- Prior to sale of the property or easement or sale of credits at a mitigation bank, a resource management plan should be approved by all appropriate agencies or non-governmental organizations involved in the property management.
- A sufficient level of funding with acceptable guarantees should be provided to fully ensure the operation and maintenance of the property as may be required.
- Provisions should be made for the long-term management of the property after the project is completed or after all mitigation credits have been awarded for the mitigation bank.
- Provisions should be made for ensuring implementation of the resource management plan in the event of non-performance by the owner of the property or non-performance by the mitigation bank owner and/or operator.
- Provisions should be made for the monitoring and reporting on the identified species/habitat management objectives, with an adaptive management/effectiveness monitoring to modify those management objectives as needed.

perations Impact Mitigation and Adaptive Management

Operations impact mitigation and adaptive management generally occur only if the level of fatalities at a project site was unanticipated when the project was permitted, and therefore, measures included in the permit are inadequate to avoid, minimize, or compensate for bird or bat fatalities. Once a project is operating, options for impact avoidance and minimization are very limited. Therefore, the lead agency and developer must develop contingency plans to mitigate high levels of unanticipated fatalities before issuing permits. Permit conditions should explicitly establish a range of compensatory mitigation options to offset unexpected fatalities and the thresholds that will trigger implementation. In extreme cases, additional compensatory mitigation may not be adequate for high levels of unanticipated impacts, and project operators may need to consider operational and facility changes such as habitat modification, seasonal changes to cut-in speed, limited and periodic feathering of wind turbines during low-wind nights, seasonal shutdowns, or removal of problem turbines.

Use the adaptive management process as a means of testing these operational and facility changes as experimental options to determine their effectiveness in reducing fatalities. Establish the following elements for a successful adaptive management program: clear, objective, and verifiable biological goals; a requirement to adjust

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should

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for the target species

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should

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should

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Entire section should be reduced to a brief discussion of establishing a bounded range of possible mitigation if there is significant uncertainty regarding impacts (which should be avoided). The indicated edits are not sufficient.

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significantly higher than anticipated

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There is little experience in the wind industry with adaptive management techniques and they are still considered experimental.

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- The mitigation site ~~must~~ provide for the long-term conservation of the target species and its habitat.
- The site ~~must~~ be large enough to be ecologically self-sustaining and/or part of a larger conservation strategy.
- The site ~~must~~ be permanently protected through fee title and/or a conservation easement.
- Prior to sale of the property or easement or sale of credits at a mitigation bank, a resource management plan should be approved by all appropriate agencies or non-governmental organizations involved in the property management.
- A sufficient level of funding with acceptable guarantees should be provided to fully ensure the operation and maintenance of the property as may be required.
- Provisions should be made for the long-term management of the property after the project is completed or after all mitigation credits have been awarded for the mitigation bank.
- Provisions should be made for ensuring implementation of the resource management plan in the event of non-performance by the owner of the property or non-performance by the mitigation bank owner and/or operator.
- Provisions should be made for the monitoring and reporting on the identified species/habitat management objectives, with an adaptive management/effectiveness monitoring to modify those management objectives as needed.

~~O~~perations Impact Mitigation and Adaptive Management

Operations impact mitigation and adaptive management generally occur only if the level of fatalities at a project site was ~~unanticipated~~ when the project was permitted, and therefore, measures included in the permit are inadequate to avoid, minimize, or compensate for bird or bat fatalities. Once a project is operating, options for impact avoidance and minimization are very limited. Therefore, the lead agency and developer ~~must~~ develop contingency plans to mitigate high levels of unanticipated fatalities before issuing permits. Permit conditions should explicitly establish a range of compensatory mitigation options to offset unexpected fatalities and the thresholds that will trigger implementation. In extreme cases, additional compensatory mitigation may not be adequate for high levels of unanticipated impacts, and project operators may need to consider operational and facility changes such as habitat modification, seasonal changes to cut-in speed, limited and periodic feathering of wind turbines during low-wind nights, seasonal shutdowns, or removal of problem turbines.

Use the adaptive management process as a means of testing these operational and facility changes as experimental options to determine their effectiveness in reducing fatalities. Establish the following elements for a successful adaptive management program: clear, objective, and verifiable biological goals; a requirement to adjust

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and rare

management and/or mitigation measures if those goals are not met; and a timeline for periodic reviews and adjustments. Successful adaptive management requires a firm commitment by project owners to accountability and remedial action in response to new information that pre-determined bird and bat fatality thresholds are being exceeded. This commitment must be included in the permit condition(s) during the permitting process so that a mechanism is available to implement mitigation recommendations after the project is permitted.

Step 5: Collect Operations Monitoring Data Using the Standardized Monitoring Protocol

Operations monitoring, also referred to as post-construction monitoring, involves searching for bird and bat carcasses under turbines to determine fatality rates and continuing the collection of bird and bat use data, consistent with pre-permitting study methods. At a minimum, the primary objectives for operations monitoring are to determine:

- If estimated fatality rates from the pre-permitting assessment were reasonably accurate.
- If the avoidance, minimization, and mitigation measures implemented for the project were adequate or if additional corrective action or compensatory mitigation is warranted.
- Whether overall bird and bat fatality rates are low, moderate, or high relative to other projects.

Standardized Operations Monitoring Protocol for Birds and Bats

Study Duration. Monitor for two years.

Number of Carcass Search Plots. Search approximately 30 percent of the turbines, selecting this subset of turbines either randomly, via stratification, or systematically. The selection process must be scientifically defensible and should be developed in consultation with CDFG, USFWS, and other knowledgeable scientists and appropriate stakeholders.

Search Plot Size. Configure search plots at selected turbine sites so that search width is equal to the maximum rotor tip height. For example, for a turbine with a rotor tip height of 400 feet (120 meters), the search area would extend 200 feet (60 meters) from the turbine on each side. The search area may be a rectangle, square, or circle depending on turbine locations and arrangements and adjusted as needed to accommodate variations in terrain and other site-specific characteristics. Searches beyond boundaries of the proposed search area may be needed in some situations to make sure they encompass approximately 80 percent of the carcasses. Consult CDFG, USFWS, and other

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should

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, in some instances,

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The type and duration of operational monitoring should be linked to the pre-permitting monitoring.

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This monitoring should be based on the impact predictions of pre-permitting. Selection of appropriate monitoring protocols need to be compatible with the data collected during pre-permitting so that the predicted impacts can be evaluated.

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predicted

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Conduct baseline monitoring for two years, adjusted downward for Category 3 and 4 project sites as appropriate. [Expand discussion based on Table.]

knowledgeable scientists and appropriate stakeholders before modifying search plot size.

Search Protocol. Search for bird and bat carcasses using trained and tested searchers. Search a standardized transect width of 20 feet (6 meters), the searcher looking at 10 feet (3 meters) on either side. Adjust the transect width as necessary for vegetation and topographic conditions on the site. Record and collect all carcasses located in the search areas (unless they are being used as part of a scavenging trial) and determine a cause of death, if possible.

Frequency of Carcass Searches. Conduct searches ~~every two weeks for two years~~. Search frequency may need adjustment depending on rates of carcass removal (high scavenging rates warrant more frequent searches), target species, terrain, and other site-specific factors. Establish the frequency of carcass searches after analyzing the results of pilot scavenging trials and in consultation with USFWS, CDFG, and other knowledgeable scientists and appropriate stakeholders.

Searcher Efficiency Trials. Conduct searcher efficiency trials seasonally ~~over two years~~. Test each searcher by planting carcasses of species likely to occur in the project area within the search plots and monitoring searcher detection rates. Geo-reference the planted carcasses by global positioning system (GPS) and mark them in a fashion undetectable to the searcher. Test new searchers when they are added to the search team.

Carcass Removal Trials. Conduct carcass removal (scavenging) trials ~~seasonally over two years~~. Place carcasses ~~in known locations~~ in the search plots and monitor to determine removal rate. Check planted carcasses at least every day for a minimum of the first three days and thereafter at intervals determined by results from pilot scavenger trials. Where possible, use fresh carcasses of different sized birds and bats likely to occur in the project, avoiding old or long-frozen specimens and exotic species.

Bird Metrics. Record bird fatalities per MW of installed capacity ~~per year~~ and bird fatalities per rotor-swept square meter per year. ~~Additionally~~, analyze data from different bird groups (such as raptors) separately.

Bat Metrics. Record bat fatalities per MW of installed capacity per year and bat fatalities per rotor-swept square meter per year, or per other metrics endorsed by USFWS and CDFG.

Monitoring Reports. Follow standard scientific report format in operations monitoring reports and provide sufficient detail to allow agency and peer reviewers to evaluate the methods used, understand the basis for conclusions, and independently check conclusions. Append the tabulated raw data from the carcass counts and bird use

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Not much will ba learned by surveys every two weeks as by then the majority of carcasses will have been removed. No set time should be used in the guidelines. The frequency for mortality surveys for carcasses must be determined by scavenging trials if one wants to be scientific and heve comparable data.

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with a frequency based on scavenging trials.

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in consultation with the lead agency.

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in consultation with the lead agency.

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(It has not been determined which of these, or other, metrics has more predictive value. Comparisons should be made only between sites with similar conditions.)

surveys. Monitoring data may be submitted to the CDFG's Biogeographic Information and Observation System (BIOS) program, <www.bios.ca.gov>. Chapter 5 provides details on submittal procedures to BIOS.

~~***Bird Use Counts.*** **Conduct two years of BUCs, as conducted during pre-permitting monitoring (that is, every week, at sample sites established during pre-permitting studies).**~~

Bat Acoustic Monitoring. Conduct bat acoustic monitoring nightly ~~for two years~~ using the same methods as for pre-permitting monitoring if CDFG, USFWS, ~~and~~ other knowledgeable scientists and appropriate stakeholders consider this information a necessary adjunct to the bat fatality data.

~~***Exceptions to Standardized Operations Monitoring Protocol for Birds and Bats***~~

~~Certain situations~~ warrant ~~exceptions to standardized~~ protocol, ~~but~~ the responsibility of ~~proving~~ that ~~an exception~~ is appropriate and applicable is on the stakeholder attempting to justify increasing or decreasing the duration or intensity of operations monitoring. Justify birds and bats separately when considering ~~an exception~~. Consult the CEQA lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as conservation organization representatives) ~~if~~ exceptions are made to the standardized protocols so they can evaluate the information used to justify the exception and provide their input.

When Less Monitoring May Be Appropriate

A reduction of standardized monitoring to one year or less may be appropriate under the following conditions:

- If findings from pre-permitting monitoring indicate low to moderate ~~[illegible]~~ and bat use and no risk to special-status species, and
- If the site is near a comparable site with similar turbine design and layout that was recently well studied and that has scientifically defensible and relevant data showing low fatalities.

Dispensing with the second year of operations monitoring may be appropriate in a situation where:

- Bird and/or bat use was low or moderate and raptor use was low during pre-permitting monitoring and during the first year of operations monitoring, and
- Fatalities were, as estimated, low to moderate.

Deciding to reduce monitoring to less than two years requires a high standard of confidence and certainty and should be made in consultation with the CEQA lead

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[No purpose is served by post-construction BUCs as no way exists to draw any meaningful conclusions about the changes. Changes can be caused by climate, by off-site changes in bird populations, changes in bird movement patterns unrelated to the wind farm and/or related to the wind farm (no way to know), and offsite--or even out of the country--impacts to birds for which no method exists to ascertain relative to the wind farm. The one exception may be raven counts.]

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or

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if the lead agency,

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Author: karenh
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[As with pre-permitting, the concept of "excaptions" should be removed throughout the document in favor of a category approach, and a decision-tree analysis of information needs within each category. Consequently, while we have attempted to partially salvage this section, the entire section should be reconceived.]

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Situations Where Changes

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May Be Warranted

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surveys. Monitoring data may be submitted to the CDFG's Biogeographic Information and Observation System (BIOS) program, <www.bios.ca.gov>. Chapter 5 provides details on submittal procedures to BIOS.

~~**Bird Use Counts.** Conduct two years of BUCs, as conducted during pre-permitting monitoring (that is, every week, at sample sites established during pre-permitting studies).~~

Bat Acoustic Monitoring. Conduct bat acoustic monitoring nightly ~~for two years~~ using the same methods as for pre-permitting monitoring if CDFG, USFWS, and other knowledgeable scientists and appropriate stakeholders consider this information a necessary adjunct to the bat fatality data.

~~Exceptions~~ to Standardized Operations Monitoring Protocol for Birds and Bats

~~Certain situations~~ warrant ~~exceptions to standardized~~ protocol, but the responsibility of ~~proving that an exception is appropriate and applicable~~ is on the stakeholder attempting to justify ~~increasing or decreasing the duration or intensity of~~ operations monitoring. Justify birds and bats separately when considering ~~an exception~~. Consult the CEQA lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as conservation organization representatives) ~~if exceptions are made~~ to the standardized protocols so they can evaluate the information used to justify the exception and provide their input.

When Less Monitoring May Be Appropriate

A reduction of standardized monitoring to one year or less may be appropriate under the following conditions:

- If findings from pre-permitting monitoring indicate low to moderate bird and bat use and no risk to special-status species, and
- If the site is near a comparable site with similar turbine design and layout that was recently well studied and that has scientifically defensible and relevant data showing low fatalities.

Dispensing with the second year of operations monitoring may be appropriate in a situation where:

- Bird and/or bat use was low or moderate and raptor use was low during pre-permitting monitoring and during the first year of operations monitoring, and
- Fatalities were, as estimated, low to moderate.

Deciding to reduce monitoring to less than two years requires a high standard of confidence and certainty and should be made in consultation with the CEQA lead

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Many site-specific conditions will

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surveys. Monitoring data may be submitted to the CDFG's Biogeographic Information and Observation System (BIOS) program, <www.bios.ca.gov>. Chapter 5 provides details on submittal procedures to BIOS.

~~**Bird Use Counts.** Conduct two years of BUCs, as conducted during pre-permitting monitoring (that is, every week, at sample sites established during pre-permitting studies).~~

Bat Acoustic Monitoring. Conduct bat acoustic monitoring nightly ~~for two years~~ using the same methods as for pre-permitting monitoring if CDFG, USFWS, and other knowledgeable scientists and appropriate stakeholders consider this information a necessary adjunct to the bat fatality data.

Exceptions to Standardized Operations Monitoring Protocol for Birds and Bats

~~Certain situations~~ warrant ~~exceptions to standardized~~ protocol, ~~but~~ the responsibility of ~~proving~~ that ~~an exception~~ is appropriate and applicable is on the stakeholder attempting to justify increasing or decreasing the duration or intensity of operations monitoring. Justify birds and bats separately when considering ~~an exception~~. Consult the CEQA lead agency, USFWS, CDFG, biologists with specific expertise, and other appropriate stakeholders (such as conservation organization representatives) if exceptions are made to the standardized protocols so they can evaluate the information used to justify the exception and provide their input.

When Less Monitoring May Be Appropriate

A reduction of standardized monitoring to one year or less may be appropriate under the following conditions:

- If findings from pre-permitting monitoring indicate low to moderate bird and bat use and no risk to special-status species, and
- If the site is near a comparable site with similar turbine design and layout that was recently well studied and that has scientifically defensible and relevant data showing low fatalities.

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Deciding to reduce monitoring to less than two years requires a high standard of confidence and certainty and should be made in consultation with the CEQA lead

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/or

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Agree with categories but will need to define these categories in some fashion, e.g. compared to average or range in California.

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Agree but need to define. See comment above

agency, USFWS, CDFG, and other appropriate stakeholders (such as conservation organization representatives).

When More Monitoring May Be Appropriate

Operations monitoring beyond ~~the recommended~~ two years will rarely be needed if impacts to birds and bats estimated during the pre-permitting studies have been adequately avoided, minimized, and mitigated. Upon completion of ~~two years of~~ operations monitoring, CDFG, USFWS, and other scientists and stakeholders who were involved in developing the operations monitoring protocol should assess whether continued, long-term monitoring of fatalities is warranted. Monitoring at some level beyond ~~the second year~~ may be justified if ~~the standard two years of~~ operations monitoring detects fatalities unexpectedly higher than estimated during pre-permitting studies. The purpose of such monitoring would be to gather information to develop impact avoidance, minimization, and mitigation measures and to verify whether these measures were effective in reducing fatalities. Long-term monitoring on a periodic basis (for example, every five years) for the life of the project should occur if operations monitoring data or other new information suggests that project operation is likely to result in substantial impacts to birds or bats that were unanticipated and unmitigated during permitting of the project. Factors to consider in assessing the potential for unanticipated impacts include changes in bird and bat use of a site due to changes in habitat conditions or shifts in migratory and movement patterns due to climate change that might affect collision risk. The CEQA lead agency, CDFG, USFWS, and other appropriate stakeholders (such as conservation organization representatives) should participate in decisions to conduct additional standardized monitoring or in the development of special study protocols.

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CHAPTER 1: PRELIMINARY SITE SCREENING

Wind energy developers ~~need~~ information to assess the biological sensitivity of the proposed project site early in the development process. This preliminary information gathering, or site screening, consists of a reconnaissance field survey and a desktop effort to collect data about the site from databases, agencies, and local experts. Site screening is the first step in determining the kinds of studies developers will need to conduct during the "pre-permitting" phase to adequately evaluate a wind project's impacts to birds and bats.

Site screening information is required to conduct an informed impact analysis under the California Environmental Quality Act (CEQA) and other state and federal wildlife laws. Conduct data and information gathering early in the siting and development process, such as when the wind energy developer is seeking landowner agreements and investigating transmission capacity. Information compiled and analyzed early in the process allows time for conducting breeding bird surveys or raptor nest searches and assessing the potential for site use by migrating or wintering species. ~~Early information gathering also allows the project proponent the opportunity to seek a different site if unavoidable impacts seem likely despite careful turbine siting.~~

Reconnaissance Site Visit

Once the landowner has granted permission to access the proposed wind energy site, arrange for a qualified wildlife biologist who is knowledgeable about the natural history of the region to conduct a reconnaissance survey of the site. The biologist should prepare for the survey by securing recent aerial photography of the site. Surveys should be of sufficient duration and intensity to allow coverage of all habitat types in and immediately adjacent to the project area and provide a basis for predictions about species occurrence at the site throughout the year.

Databases for Gathering Site Information

The following databases are useful sources of information for site screening.

California Department of Fish and Game's (CDFG's) California Natural Diversity Database (CNDDB), <www.dfg.ca.gov/bdb/html/cnddb.html>, is an efficient and cost-effective source of biological information. The CNDDB documents records of the location and, when possible, the status of declining or vulnerable species. Be aware that occurrences are only noted in the CNDDB if the site has been previously surveyed during the appropriate season, a detection was made, and the observation was reported and entered into the database. As such, do not use the absence from the CNDDB of an occurrence in a specific area to infer absence of special-status species. It is also important

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should obtain

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This information will be used to identify species potentially at risk and the impact questions that need to be addressed, using the framework provided in Table A. [CalWEA's proposed General Framework]

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of the project. In addition, early consultation with both CDFG and U.S. Fish and Wildlife Service (USFWS) will assist project proponents in determining the applicability of other state and federal laws, including California Endangered Special Act (CESA), Federal Endangered Species Act (FESA), and Department of Fish and Game Code sections dealing with bird, bat, and raptor protection. Appendix A provides contact information for the seven CDFG regional offices and headquarters.

The USFWS has developed lists of federally Threatened, Endangered, and candidate species arranged by county or USGS quadrangle that are available from the Ecological Services Offices (see Appendix B for Ecological Services Office contact information). The USFWS also periodically identifies birds that are high priorities for conservation action, <www.fws.gov/migratorybirds/reports/bcc2002.pdf>. USFWS biologists can also offer information about listed species and designated critical habitat. Coordinate early with USFWS biologists to identify potential impacts to federally listed and migratory species that are high priorities for conservation.

Local Experts and Other Resources

Other helpful sources of information include contacts with biologists familiar with the area, including staff from universities, colleges, bird observatories, and Audubon chapters, <www.audubon.org/states/index.php?state=CA>, as well as local birders and bat experts. National Audubon Society Christmas bird count data, <www.audubon.org/bird/cbc>, and North American Breeding Bird Survey data, <www.mbr-pwrc.usgs.gov/bbs/>, can provide useful information about species and abundance of birds during winter and spring in portions of California. Audubon California has mapped approximately 150 areas in the state that it considers "Important Bird Areas," <www.audubon-ca.org/IBA.htm>.

Evaluating Data from Nearby Wind Energy Facilities

If the proposed site is near one or more existing wind energy facilities, a biologist should ~~critically~~ review the pre-permitting and operational studies completed for the nearby facilities and compare the conclusions with results of the operational monitoring data at those sites. A site visit is also essential to determine if biological conditions at the proposed site are similar to those described at the existing project or projects. If studies from nearby sites are used to form the basis of the environmental analyses for new wind energy projects, the developer must be able to demonstrate that those studies are applicable to the proposed project, ~~given that biological and regulatory environments and wind industry technology are always changing.~~ Include data from nearby wind farms in regional or cumulative impact assessments. Regularly contributing wind-related wildlife data to BIOS, as described in Chapter 5, will facilitate such assessments and the general accessibility of biological data from nearby wind energy facilities.

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Cities and counties may also have adopted wind energy ordinances or elements that may have been subjected to review under CEQA and may contain information on local birds and bats.

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Evaluating and Acting on Site Screening and Assessment Data

The preliminary information gathering phase leads to a critical decision point in project site screening: whether or not a project and its proposed site have the potential for ~~irresolvable problems with bird or bat fatalities.~~ If a project moves forward despite indications that ~~substantial bird or bat fatalities~~ might occur, avoidance and minimization options to reduce the impacts are limited, and the project may require costly, ongoing reassessment of impacts and adjustment of mitigation. ~~However, if preliminary information gathering does not reveal potential for substantial bird or bat fatalities in the proposed wind energy project area, the~~ next step is to determine the kinds of studies and level of effort needed for the pre-permitting surveys. This assessment involves asking questions about the potential for birds and bats to occur at the site, how birds and bats might use the site, and whether they might be at risk from wind turbine collisions. Pre-permitting studies will provide the basis for an impact assessment and subsequent recommendations for micrositing or other impact avoidance, minimization, or mitigation measures. Consider the following questions when assessing the potential for birds and bats to occur at the site, making a preliminary evaluation of collision risk, and designing the pre-permitting studies discussed in Chapter 3.

1. Are any of the following known or likely to occur on or near the proposed project site? ("Near" refers to a distance that is within the area used by an animal in the course of its normal movements and activities.)
   - Species listed as federal or state "Threatened" or "Endangered" (or candidates for such listing)?
   - Special-status bird or bat species?
   - Fully protected bird species?
2. Is the site near a raptor nest, or are large numbers of raptors known or likely to occur at or near the site during portions of the year?
3. Is the site near important staging or wintering areas for waterfowl, shorebirds, or raptors?
4. Are colonially breeding species (for example, herons, shorebirds, seabirds) known or likely to nest near the site?
5. Is the site likely to be used by birds whose behaviors include flight displays (for example, common nighthawks, horned larks) or by species whose foraging tactics put them at risk of collision (for example, contour hunting by golden eagles)?
6. Does the site or do adjacent areas include habitat features (for example, riparian habitat, water bodies) that might attract birds or bats for foraging, roosting, breeding, or cover?
7. Is the site near a known or potential bat roost?
8. Does the site contain topographical features that could concentrate bird or bat movements (for example, ridges, peninsulas, or other landforms that might

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significant unavoidable biological impacts on birds or bats.

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funnel bird or bat movement)? Is the site near a known or likely migrant stopover site?

9. Is the site regularly characterized by seasonal weather conditions such as dense fog or low cloud cover that might increase collision risks to birds and bats, and do these events occur at times when birds might be concentrated?

A "yes" answer to question #1 ~~should~~ prompt early ~~and close~~ consultation with CDFG and USFWS to develop a study plan that addresses potential impacts of ~~constructing~~ and operating the project on listed or special-status species. Advance planning is needed in particular for studies with a seasonal component (for example, nest searches or evaluating potential bat hibernacula). Allow ample time for planning field evaluations when special-status species are involved because survey protocols for a number of listed and special-status species specify a limited window of time during which surveys must be conducted.

"Yes" answers to questions #2 through #6 call for further investigation with the techniques described in Chapter 3. The standardized bird use counts discussed in Chapter 3 provide methods to assess the species composition and seasonal relative abundance of birds present in the vicinity of proposed wind turbine sites, but additional studies might also be needed to further investigate these questions. For example, a project proponent may want to intensify the level of survey effort in the vicinity of raptor nests, breeding colonies, or habitat elements (riparian habitat, stands of trees in otherwise treeless areas) that might attract birds or bats. Such studies would provide information to determine if a non-disturbance buffer might be warranted in the vicinity of the sensitive feature, determine the appropriate size of the buffer zone, and develop appropriate compensatory mitigation.

"Yes" answers to questions #7 through #9 should prompt consultation with CDFG, USFWS, and scientists with expertise in migratory birds and bat biology. The nocturnal survey methods described in Chapter 3 discuss techniques to assess nocturnally active species in the project area.

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[New paragraph] "No" answers to these questions indicate that more limited site evaluation may be called for.

CHAPTER 2: CEQA, WILDLIFE PROTECTION LAWS, AND THE PERMITTING PROCESS

Numerous regulatory requirements and wildlife protection laws govern the permitting process for locating a wind energy project. ~~Approached individually, these regulatory requirements may seem daunting to wind energy project developers. Therefore, this~~ chapter intends to clarify the permitting process and offer suggestions for successfully completing the process and conforming to all appropriate laws and regulations by:

- Providing an understanding of the regulatory framework of environmental laws and processes that govern project siting and permitting.
- Providing an understanding of the agencies and other stakeholders that should be engaged in these processes.
- Encouraging consistent use of pre-permitting assessment methods recommended in these *Guidelines* to secure information on impacts and mitigation that will apply both to the CEQA review and permitting process and wildlife protection laws.

Initiating the Permitting Process

In California, it is primarily the local agencies that handle the permitting process for wind energy facilities under the ~~mandates of their various land use authorities.~~ Discretionary decisions by local agencies to permit wind energy projects trigger the application of CEQA requirements to the permitting process. The permitting process usually begins with the project developer approaching the county or other local public agency responsible for issuing a land use permit. Typically this agency becomes the "lead agency" under CEQA. CEQA provides direction on assessment of the significance of impacts and the development of feasible mitigation, but the county or responsible public agency may have its own resource standards as well. Contact the local agency early in the process to determine if it has its own standard conditions for addressing specific resource policies that apply to bird and bat issues.

Wind energy facilities which ~~have effects on~~ state-listed Threatened or Endangered species may require an additional permit under the California Endangered Species Act (CESA). If the affected species are also federally listed, the facilities may also require permits under FESA.

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constitutional land use authority.

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"take"

Other state and federal protective wildlife laws, some of which mandate avoidance of "take"[3] without options for permitting, also influence project siting and operations. Project developers, permit decision makers, and the resource agencies involved must consider these strict liability laws during the permitting process to ensure that impacts to bird and bat species are minimized and mitigated to offset impacts. Compliance with the *Guidelines* during the permitting process will demonstrate a good faith effort to develop and operate projects in a fashion that is consistent with the intent of these state and federal wildlife protection laws.

Involving and Communicating with Regulatory Agencies and Stakeholders

Timely and thorough pre-permitting assessment surveys are essential to facilitate the permitting process. The developer should contact landowners; local environmental groups; and local, state, and federal wildlife management agencies such as CDFG and USFWS early in the permitting process. Pre-permitting discussions with these groups may provide critical information on which to base site development decisions. ~~There may be an existing science advisory committee that has been involved with a nearby wind resource area and that can provide information on bird and bat issues of local concern.~~ Local environmental groups and wildlife agencies may have relevant information as well as concerns about special-status birds or bats. Early discovery of these issues can give the project developer a glimpse of the type and timing of surveys that ~~will be necessary.~~ Early discussion of proposed survey protocols also will allow for an evaluation of the level and timing of the effort in relation to project milestones such as the desired construction start date.

Further, initiating assessment surveys early will help to avoid unnecessary and costly delays during permitting. ~~Adherence to *Guidelines* protocols, including standardization of data,~~ will facilitate the necessary detailed analysis by the CEQA lead agency, responsible agencies such as CDFG, and public stakeholders and should increase the speed of the permitting process. If review under the National Environmental Quality Act (NEPA) as well as CEQA is required, then efficient coordination of the combined CEQA/NEPA process ~~is essential to~~ prevent redundancies and to ensure complete coverage of the joint review requirements.

Early identification of potential adverse impacts provides more opportunities for implementing impact avoidance and minimization measures. An estimation of potential impacts is also the primary factor in determining monitoring levels once operation of the project has begun. Finding suitable habitat for compensatory mitigation, if necessary, can be time consuming; early and thorough data collection and analysis will aid this

[3] "Take" is defined in section 86 of the California Department of Fish and Game Code as "hunt, pursue, catch, capture, or kill (and attempts to do so)."

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"~~Compliance with~~ Use of the *Guidelines*, modifications of the *Guidelines* made in consultation with the lead agency, or other scientifically valid approaches for baseline studies and monitoring identified, during the permitting process will demonstrate a good faith effort to develop and operate projects in a fashion that is consistent with the intent of these state and federal wildlife protection laws."

OR

"~~Compliance with~~ Use of the *Guidelines* during the permitting process will demonstrates an ~~good faith~~ effort to develop and operate projects in a fashion that is consistent with the intent of these state and federal wildlife protection laws."

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Other state and federal protective wildlife laws, some of which mandate avoidance of "take"[3] without options for permitting, also influence project siting and operations. Project developers, permit decision makers, and the resource agencies involved ~~must~~ consider these strict liability laws during the permitting process to ensure that impacts to bird and bat species are minimized and mitigated to offset impacts. Compliance with the *Guidelines* during the permitting process will demonstrate a good faith effort to develop and operate projects in a fashion that is consistent with the intent of these state and federal wildlife protection laws.

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Further, initiating assessment surveys early ~~will~~ help to avoid unnecessary and costly ~~delays~~ during permitting. ~~Adherence to *Guidelines* protocols, including standardization of data,~~ will facilitate the necessary detailed analysis by the CEQA lead agency, responsible agencies such as CDFG, and public stakeholders and ~~should~~ decrease the speed of the permitting process. If review under the National Environmental Quality Act (NEPA) as well as CEQA is required, then efficient coordination of the combined CEQA/NEPA process ~~is essential to prevent~~ redundancies and to ensure complete coverage of the joint review requirements.

Early identification of potential adverse impacts provides more opportunities for implementing impact avoidance and minimization measures. An estimation of potential impacts is also the primary factor in determining monitoring levels once operation of the project has begun. Finding suitable habitat for compensatory mitigation, if necessary, can be time consuming; early and thorough data collection and analysis will aid this

[3] "Take" is defined in section 86 of the California Department of Fish and Game Code as "hunt, pursue, catch, capture, or kill (and attempts to do so)."

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process. Inadequate data acquisition may ~~result in more stringent impact avoidance,~~ minimization, or mitigation measures to ensure species protection ~~and will likely result~~ in increased levels of operations monitoring.

Establishing Permit Conditions and Compliance

The CEQA lead agency and project proponent should consult frequently with CDFG and USFWS throughout the impact analysis and mitigation development process and particularly during development of permit conditions. Structure permit conditions to clearly define the obligations of the operator ~~and to solidly establish~~ triggers for additional mitigation beyond that required upon project approval. For example, the permit could specify a range of expected impacts based on pre-permitting studies and existing data from other wind energy projects; requirements for additional compensatory mitigation, described in the permit, would be triggered if operations monitoring data revealed impacts in excess of the predicted range. Compliance with mitigation and operations monitoring requirements, as well as all other conditions of the permit, are equally important after permits are issued.

Navigating CEQA Requirements and Local, State, and Federal Laws

The California Environmental Quality Act, or CEQA, governs how California counties, cities, and other government entities evaluate environmental impacts ~~to make~~ discretionary permitting decisions for wind energy development. ~~The CEQA process is key to achieving environmental compliance for a project, but all parties involved in planning pre-construction surveys should be aware that following the CEQA Guidelines alone may not highlight all of the species and issues that need evaluation.~~ A single, coherent analysis of impacts to biological resources sets the stage for both CEQA analysis and agency review of permit applications. To streamline the permit application process, consider other state and federal wildlife protection laws, discussed below, early in the process and integrate them into the pre-permitting study design. For example, species at potential risk that are fully protected or that fall under the protection of the federal Migratory Bird Treaty Act ~~must be~~ included in surveys, whether or not such studies might be required to assess CEQA significance. Initiating timely and thorough surveys is also important when considering the potential for state or federal listed species, and contacting agencies early in the permitting process can reduce the potential for lengthy delays in securing take permits. ~~The permit conditions may need to include additional mitigation above and beyond that required by CEQA to avoid, minimize, and fully mitigate impacts to birds and bats.~~

County Ordinances / Regulations

Some California counties have adopted wind resource elements as part of their general plans and/or wind energy zoning ordinances. County siting elements and zoning ordinances govern the areas in which wind projects may or may not be located, with

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including, if deemed necessary by the lead agency, well-defined and clearly bounded

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process. Inadequate data acquisition may result in more stringent impact avoidance, minimization, or mitigation measures to ensure species protection and will likely result in increased levels of operations monitoring.

Establishing Permit Conditions and Compliance

The CEQA lead agency and project proponent should consult frequently with CDFG and USFWS throughout the impact analysis and mitigation development process and particularly during development of permit conditions. Structure permit conditions to clearly define the obligations of the operator and to solidly establish triggers for additional mitigation beyond that required upon project approval. For example, the permit could specify a range of expected impacts based on pre-permitting studies and existing data from other wind energy projects; requirements for additional compensatory mitigation, described in the permit, would be triggered if operations monitoring data revealed impacts in excess of the predicted range. Compliance with mitigation and operations monitoring requirements, as well as all other conditions of the permit, are equally important after permits are issued.

Navigating CEQA Requirements and Local, State, and Federal Laws

The California Environmental Quality Act, or CEQA, governs how California counties, cities, and other government entities evaluate environmental impacts to make discretionary permitting decisions for wind energy development. ~~The CEQA process is key to achieving environmental compliance for a project, but all parties involved in planning pre-construction surveys should be aware that following the CEQA Guidelines alone may not highlight all of the species and issues that need evaluation.~~ A single, coherent analysis of impacts to biological resources sets the stage for both CEQA analysis and agency review of permit applications. To streamline the permit application process, consider other state and federal wildlife protection laws, discussed below, early in the process and integrate them into the pre-permitting study design. For example, species at potential risk that are fully protected or that fall under the protection of the federal Migratory Bird Treaty Act must be included in surveys, whether or not such studies might be required to assess CEQA significance. Initiating timely and thorough surveys is also important when considering the potential for state or federal listed species, and contacting agencies early in the permitting process can reduce the potential for lengthy delays in securing take permits. ~~The permit conditions may need to include additional mitigation above and beyond that required by CEQA to avoid, minimize, and fully mitigate impacts to birds and bats.~~

County Ordinances / Regulations

Some California counties have adopted wind resource elements as part of their general plans and/or wind energy zoning ordinances. County siting elements and zoning ordinances govern the areas in which wind projects may or may not be located, with

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Note: CEQA does not authorize imposition of mitigation above and beyond the authority provided by laws other than CEQA. Public Resources Code Sec. 21004: "In mitigating or avoiding a significant effect of a project on the environment, a public agency may exercise only those express or implied powers provided by law other than this division. However, a public agency may use discretionary powers provided by such other law for the purpose of mitigating or avoiding a significant effect on the environment subject to the express or implied constraints or limitations that may be provided by law."

restrictions to agricultural zones being a common theme. The ordinances generally specify standards for setbacks, height, noise, safety, aesthetics, and other requirements. Most county general plans specify that the processing of discretionary energy project proposals shall comply with CEQA and direct that the environmental impacts of a project must be taken into account as part of project consideration. Typically, general plans also direct planning staff to work with local, state, and federal agencies to ensure that energy projects (both discretionary and ministerial) avoid or minimize direct impacts to fish, wildlife, and botanical resources, wherever practical. Some county ordinances include language regarding assessment of impacts to birds and bats, but, currently, none provide specific guidance on studies necessary for assessing significance of impacts to bird and bat populations or provide direction for monitoring programs and feasible mitigation options.

State Laws

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires lead agencies—that is, those making land use decisions—as well as any other responsible state agencies issuing permits, to evaluate and disclose the significance of all potential environmental impacts of a project. The lead agency is also responsible for implementing feasible impact avoidance, minimization, or mitigation measures that reduce and compensate for significant environmental impacts with the goal of reducing those impacts to less than significant levels. Lead agencies determine significance on a project-by-project basis because they must consider all potential risk, including cumulative impacts, within a local and regional context, as well as evaluate unique factors particular to the project area when exercising their discretion to approve or disapprove a project.

The CEQA Guidelines[4] specify that a project has a significant effect on the environment if, among other things, it substantially reduces the habitat of a fish or wildlife species, causes a fish or wildlife population to drop below self-sustaining levels, or threatens to eliminate a plant or animal community (CEQA Guidelines §15065[a][1]).

The Environmental Checklist Form in the CEQA Guidelines, Appendix G, states that impacts to biological resources are considered "significant" if, among other things, a proposed project will:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS.

[4]All citations of "CEQA Guidelines" refer to Title 14, California Code of Regulations, sections 15002-15387

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Many county elements and ordinances considered impacts to biological resources when they were adopted, as required under CEQA.

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discretionary

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substantially reduce the number or restrict the range of an endangered, rare, or threatened species,

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations by CDFG or USFWS.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

CEQA defines three types of impacts, all of which must be evaluated for each wind energy project:

- "Direct" impacts are caused by a project and occur at the same time and place (CEQA Guidelines §15358[a][1]).
- "Indirect," or "secondary," impacts are reasonably foreseeable and are caused by a project but occur at a different time or place. They may include growth-inducing effects and other effects related to changes in the pattern of land use, population density, or growth rate and related effects on air, water, and other natural systems, including ecosystems (CEQA Guidelines §15358[a][2]).
- "Cumulative" impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355[b]). Impacts from individual projects may be considered minor, but considered collectively with other projects over a period of time, those impacts could be significant, especially where listed or sensitive species are involved.

Fish and Game Code Wildlife Protection Laws

~~In the broadest sense, CEQA and Fish and Game Code require that government agencies develop standards and procedures necessary to maintain, protect, restore, and enhance environmental quality, including fish and wildlife populations and plant and animal communities, to ensure that projects are consistent with the intent of these laws.~~

For wind energy projects subject to CEQA, lead agencies are required to consult with CDFG, pursuant to CEQA Guidelines section 15086. CDFG uses its biological expertise to review and comment upon impacts to wildlife arising from the project and will make recommendations regarding the protection of those resources it holds in trust for the people of California. In addition, CDFG reviews and comments on environmental documents and impacts arising from project activities (Fish and Game Code §1802). CDFG is considered a trustee agency under CEQA Guidelines section 15386.

CDFG does not approve or disapprove a wind energy project as a trustee agency in the CEQA process but does have authority to regulate ~~projects~~ that implicate one of the statutes that CDFG administers. CDFG and the Energy Commission encourage the use of the *Guidelines* for the biological assessment, mitigation, and monitoring of wind energy development projects and wind turbine repowering projects in California. The

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This statement is too broad. It is an expansive interpretation of the CFAG Code that is not supported by any specific provision of law.

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significant

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activities

CDFG is aware that wind energy projects may result in bird and bat fatalities despite avoidance and minimization measures. For projects that impact listed species, project developers will need to consult with CDFG and may consider preparing a regional conservation plan or Natural Community Conservation Plan to seek permit coverage. For projects that ~~have impacts to non-listed species~~, CDFG will consider working with project proponents to develop ~~site-specific~~ mitigation agreements that include avoidance, minimization, and compensation measures based on the guidance provided in this document.

This document only relates to bird and bat species, but a wind energy project may impact special-status species other than birds or bats. These impacts must also be analyzed, and in some cases treated as significant, as part of CEQA. ~~Construction-related impacts at wind energy facilities which affect listed "Threatened" and "Endangered" species and other wildlife may also (and often do) trigger state and federal permit requirements.~~

When CDFG is required to make a discretionary decision to permit a project under its regulatory authority, CDFG must also comply with CEQA in the issuance of these permits and other project approvals. When the project CEQA document is developed in consultation with CDFG and fully addresses the related resource impacts and mitigation, CDFG can use the document as a basis for CEQA compliance, thereby accelerating any subsequent permit processes.

In addition to CDFG's responsible and trustee role in the CEQA process, direct consultation with CDFG ~~is required to ensure~~ that a proposed project will meet the intent of Fish and Game Code statutes for the protection of wildlife species. Several California Fish and Game Code sections that relate to protection of avian wildlife resources and are relevant to wind energy projects are described below.

- California Endangered Species Act (CESA), 1984 – Fish and Game Code section 2050 et seq. Species that are protected by the state (listed as Endangered, Threatened, or as a candidate) cannot be taken without an Incidental Take Permit (ITP) provided by CDFG or other document authorized by CESA. "Take" is defined in section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill (and attempts to do so)." CESA allows for permitted take incidental to otherwise lawful development projects if all standards in section 2081(b) of the Fish and Game Code are met. In issuing an ITP, CDFG typically requires additional impact avoidance, minimization, or mitigation measures beyond those that may be imposed pursuant to CEQA to ensure that project impacts are minimized and fully mitigated. The issuance of an ITP is a discretionary action by CDFG. When issuing a CESA Incidental Take Permit, CDFG must itself also comply with CEQA. The following link provides access to the full statute: <www.dfg.ca.gov/hcpb/ceqacesa/cesa/incidental/cesa_policy_law.shtml>.

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"take"

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are likely to cause mortality to or adversely impact

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may be

alternatives to, major federal actions significantly affecting the environment. The law applies to federal agencies and the programs that they fund, including projects for which they issue permits. An example of a wind development project falling under NEPA jurisdiction would be the proposed placement of wind turbines or associated transmission lines on U.S. Forest Service or Bureau of Land Management land.

Recent amendments to NEPA require federal agencies to cooperate with state and local agencies to eliminate duplication of procedures such as those that might result from fulfilling CEQA requirements. More details on the National Environmental Policy Act can be found at <www.nepa.gov/nepa/regs/nepa/nepaeqia.htm>.

- Federal Endangered Species Act (FESA), 1973, Title 16, U.S. Code section 1531 – FESA protects 18 bird species/subspecies listed as Threatened or Endangered in California. No bats are currently listed as Threatened or Endangered in California. FESA prohibits the take of protected animal species, including actions that "harm" or "harass"; federal actions may not jeopardize listed species or adversely modify habitat designated as critical. FESA authorizes permits for the take of protected species if the permitted activity is for scientific purposes, is to establish experimental populations, or is incidental to an otherwise legal activity.
- Migratory Bird Treaty Act (MBTA), 1918, Title 16, U.S. Code sections 703 to 712 – MBTA prohibits the take, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by USFWS. At least 603 migratory bird species have been recorded in California. The MBTA authorizes permits for some activities, including but not limited to scientific collecting, depredation, propagation, and falconry. No permit provisions are available for incidental take. Only criminal penalties are possible, with violators subject to fine and/or imprisonment.
- Bald and Golden Eagle Protection Act, 1940, Title 16, U.S. Code section 668 – This law provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the act.

Like the California laws, the latter three strict-liability federal wildlife protection laws prohibit most instances of take, although each law provides for exceptions, such as for scientific purposes. FESA authorizes USFWS to permit some activities that take a protected species as long as the take meets several requirements, including a requirement that the take be incidental to an otherwise legal activity. Permits may be issued under FESA to a federal permitting agency, or developers may seek an Incidental Take Permit under FESA for facilities sited on private land or where no federal funding is used or no other federal permit is required. The MBTA and the Bald and Golden Eagle

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T Not all wind projects requiring federal action trigger the need for an EIS, but rather may be permitted on the basis of an Environmental Assessment Finding of No Significant Impact (FONSI).

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T or for wind development

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T None of these exceptions apply to commercial wind energy developments.

CHAPTER 3: PRE-PERMITTING ASSESSMENT

This chapter provides guidance on collecting biological information to assess the potential direct and indirect impacts to birds and bats at proposed wind energy development sites and to develop impact avoidance, minimization, or mitigation measures. The chapter includes recommendations on developing a scientific pre-permitting study and assessing the level of effort required for such studies. Finally, the chapter describes the study methods available for bird and bat field studies and recommended protocols for using the methods.

Determining the Level of Pre-Permitting Surveys

Most pre-permitting surveys should last a minimum of one year to document how birds and bats use a site during spring, summer, winter, and fall. A single season of data from one year may be inadequate to assess relative abundances of some bird and bat species using the site because seasonal populations of some species are highly variable from year to year. For example, in California's Central Valley, wintering populations of rough-legged hawks, short-eared owls, sandhill cranes, and many waterfowl species can vary considerably from year to year depending on weather conditions in the northern portions of their ranges (Heil and Beedy, 1996; Garrison, 1993; Schlorff, 1994).

Base any changes to the recommended duration or intensity of pre-permitting studies on the availability of site-specific, baseline data; the species potentially affected; and the magnitude of the anticipated effect. Studies in excess of one year may be necessary in areas lacking baseline information, where considerable annual and seasonal variation in bird and bat populations is suspected or where there is potential for declining or vulnerable species to occur at the site. The number and size of turbines and the extent of the area covered by the project will also influence the need for more or less study because as the number of turbines increases, the magnitude of the potential impact to bird and bat populations will also increase. Proposed projects that involve developing multiple groups of turbines over large geographical areas or those that cover a heterogeneous mix of habitats and terrain may need additional specialized, multi-year studies. Such large-scale studies may be best addressed with a collaborative approach that encompasses a number of different projects within a region.

Not all proposed wind energy projects require a full year of pre-permitting studies. Reduced study effort might be appropriate if scientifically defensible data are available from a nearby project. To be applicable to a newly proposed project, these studies of nearby areas need to provide adequate information to make a fully informed and rigorous impact assessment and develop effective impact avoidance, minimization, or mitigation recommendations. For example, less pre-permitting study might be sufficient

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specific

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The level of pre-permitting assessment should be guided by the category that a project falls into within the framework set forth in Table A.

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of interest

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needed to answer the impact questions,

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nature of the impact questions,

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, e.g. Category 4 projects

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that can inform decision-making by the lead agency.

for a small project near an existing, well-studied site for which there is a high level of knowledge about potential impacts to birds and bats and for which operations monitoring studies have confirmed a low level of impacts.

~~A decision to reduce the proposed study duration to less than one year or to use existing data rather than collect new field data should be made with the advice of CDFG, USFWS, and other experienced biologists. Caution is warranted in extrapolating~~ existing data to unstudied nearby sites. Slight topographical or habitat variations can make substantial differences in bird and bat site use and potential impacts. In addition, technological changes including use of large turbines, variations in turbine design or layout, increased operating times, and use of different lighting may require new or additional data gathering.

Securing Appropriate Expertise to Develop the Studies

An important component in the development of pre-permitting studies is early consultation with the lead agency and contacts with CDFG, USFWS, local environmental groups, and any other stakeholders with an interest in the project. The lead agency needs to know that the pre-permitting study design has incorporated input from appropriate scientists and from all interested parties. Lead agencies generally rely on experts hired by the project proponent and on biologists from USFWS and CDFG to provide input on pre-permitting study design and on other scientific decision points. Some projects may need additional expertise, which members of a science advisory committee can supply. ~~A standing science advisory committee can provide a consistent forum for lead agencies, agency biologists, and other scientists to discuss technical issues relating to the project. A standing scientific advisory committee has particular value if a lead agency is addressing numerous proposed wind energy projects in a county or region because it provides consistent data interpretation and recommendations.~~

The Energy Commission, in consultation with CDFG, proposes to establish a statewide standing science advisory committee that could also provide information to lead agencies seeking additional scientific expertise. The science advisory committee would include biologists and environmental scientists with expertise in bird and bat wildlife issues related to wind energy development, as well as experts in avian and bat biology (including migratory and flight behavior), raptor ecology, survey protocols, and study design. In the event that unique circumstances require individuals with a specific subject-matter expertise or a familiarity with a specific regional or local issue(s), the Energy Commission, in consultation with CDFG, would work with the lead agency to ensure that appropriate members are included in the standing science advisory committee.

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If a project falls within a Category 3 area (See Table A) then less than or more than one year of monitoring may be appropriate.

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Study Objectives and Design

Development of a pre-permitting study begins with a clear identification of the research ~~questions. The next step~~ is establishing a study design appropriate for answering those questions ~~and deciding on sampling units, parameters, metrics~~ (measurements), and specific methods to employ.

The National Wind Coordination Committee (NWCC) provides detailed information about the metrics and methods for designing pre-permitting studies (Anderson et al., 1999). Because that information focuses mostly on diurnal birds, the NWCC is currently developing complementary guidelines to address nocturnally active species in relation to wind power development (Kunz et al., in prep). Consult both documents in the course of developing pre-permitting and operations study design.

Study objectives will vary from site to site, but key issues on most wind energy projects in California will typically include at least the following questions:

- Which species of birds and bats use the project area, ~~and what is their~~ relative abundance throughout the year?
- How much time do birds and bats spend in the risk zone (rotor-swept area), and does this vary by season?
- What is the estimated range of bird and bat fatalities from the project, and how does bird/bat use of the site compare to use data from other wind power sites that also have fatality information?
- What potential design and mitigation measures could reduce impacts?

Answering these questions ~~involves~~ a variety of diurnal and nocturnal bird survey techniques as well as bat survey methods. The bird use count to assess bird species composition and seasonal relative abundance is one of the most commonly used bird survey methods. Acoustic monitoring is the primary method used to assess species composition and activity levels of bats. Other techniques include raptor nest searches, which should be conducted on most wind energy development projects in California, and a variety of less frequently used methods such as small bird counts, area searches, migration counts, radar, mist-netting, and visual imaging. Some of these additional methods may be useful depending on the particular concerns at each project site. The remainder of the chapter details the various methods and how to select the most appropriate and useful method based on the concerns for each project site.

Standardization in survey techniques promotes comparison capability at wind energy projects throughout California by employing similar methods and metrics at wind energy projects throughout the state. For example, standardized bird use counts provide baseline data on avian species richness, relative abundance, and diurnal bird use in the vicinity of proposed turbine sites. These standardized methods have been used for many

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impact questions that need to be addressed.

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the data needs,

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and providing the necessary data to answer these questions. This step will determine the

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This is a good start on defining the types of studies that might be appropriate, but it needs to be expanded and needs to reflect how the pre permitting information will be used in the impact assessment and operational monitoring.

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? Which of these species are susceptable to wind turbine impacts. What

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How will pre-permitting data be used in Operational monitoring impact assessment?

Comments from page 53 continued on next page

Study Objectives and Design

Development of a pre-permitting study begins with a clear identification of the ~~research questions~~. The next step is establishing a study design appropriate for answering those questions ~~and deciding on~~ sampling units, parameters, metrics (measurements), and specific methods to employ.

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will involve

wind energy projects throughout the United States and therefore have benefit for comparative purposes. Anderson et al. (1999) describe these methods in detail and discuss standardized metrics and methods endorsed by the NWCC and subsequently used in many studies (for example, Anderson et al., 2005; Johnson et al., 2000; Kerlinger et al., 2006; Smallwood and Thelander, 2004).

Diurnal Avian Surveys

The primary diurnal avian survey technique for pre-permitting studies at wind energy project areas is the bird use count (BUC). Small bird counts (SBCs), area searches, raptor nest searches, and a variety of other methods may also be needed if BUCs are not adequate to answer questions about bird use and potential impacts. BUCs estimate the spatial and temporal use of the site by all birds, including large birds such as raptors, vultures, corvids, and waterfowl, as well as songbirds and other small species. Table 1 summarizes the diurnal avian survey techniques discussed below and when to use them.

All of these survey techniques require experienced surveyors who are skilled at identifying the birds likely to occur in the project area and who are proficient at accurately estimating vertical and horizontal distances. Kepler and Scott (1981) provide details on training observers to estimate distances and testing surveyors for their abilities to identify birds by sight and sound. Analysis of data from BUCs, SBCs, and other surveys should include suitable measures of precision of count data such as standard error, coefficient of variation, or confidence interval (Rosenstock et al., 2002).

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It is important to establish a linkage between pre-permitting monitoring and operational monitoring.

1446 **Table 1. Comparison of Diurnal Bird Survey Techniques for Pre-Permitting Studies**

Technique	Purpose	When to Use
Bird Use Counts	To provide baseline data on bird species composition, occurrence, frequency, and behavior to compare with operations use and fatality data; to inform micrositing decisions; to provide estimate of potential collision risk based on time spent in rotor-swept area; to provide an estimate of spatial and temporal use of site by all diurnal birds, including large birds (raptors, vultures, corvids, and waterfowl), songbirds, and other small diurnal bird species.	Use on all proposed wind energy projects to provide standardized baseline data on bird use and collision risk.
Raptor Nest Searches	To evaluate location and activity level of nesting raptors in relation to proposed wind turbine sites.	Use to micrositе turbines to reduce potential impacts to nesting raptors, to develop appropriate buffer zones around breeding territories, and to develop compensatory mitigation measures for impacts to raptors.
Small Bird Counts	To provide a relative density estimate of resident breeding songbirds.	Use if project poses a significant indirect impact to resident songbird populations, such as displacement, avoidance, or loss of special-status bird breeding habitat.
Area Searches	To sample the entire avifauna of a wind resource area, including habitats not represented in BUC sample areas.	Use if BUCs might miss special-status species potentially impacted by the proposed project.
Migration Counts	To provide a more complete picture of species composition, passage rates, and flight height of diurnal migrants.	Use if project site is within a known or likely migration corridor and BUCs are insufficient (too brief in duration or infrequent) to assess potential collision risk to diurnal migrants.
Mist-Netting	To detect secretive, cryptic, rare, or hard to identify species; to collect data on condition and age of birds in the project area; to document species composition at migrant stopover sites; to distinguish between wintering and migrant birds.	Use if near a known or likely migratory stopover/fallout site to assess species composition of migrants or if demographic information is needed to make impact assessment to special-status bird population potentially affected by the proposed project.

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provide
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during pre-permitting or operational monitoring
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Use on all proposed wind energy projects to provide standardized baseline data on raptor use and collision risk.
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provide baseline data to

red bats (Kerlinger et al., 2006). While north-south bat migration has been at least locally documented for several species, flyways are poorly known, and trans-Sierra, elevational, as well as interior-to-coast migrations apparently also occur. California's large latitudinal range means that it provides both migratory pathways and migratory destinations, with some species likely raising young in Northern and Central California. Given the diversity and complexity of bat movements within the state and the uncertainty surrounding potential impacts of wind turbines on bat populations, pre-permitting studies are needed at all proposed wind energy sites to investigate the presence of migratory or resident bats and to assess collision risk.

Acoustic Detection

Acoustic detection involves specialized acoustic systems (for example, AnaBat©, SonoBat©) that allow an experienced user to identify some bat species by comparing the recorded calls to a reference library of known calls. Because bats usually echolocate as they fly, broadband detection systems covering the frequency range that bats use can provide a measure of bat activity. Acoustic systems designed to monitor birds are not suitable for bats because of differences in the vocalization frequencies of bats and birds. With these acoustic systems, skilled bat biologists may be able to detect and identify some bat species.

Acoustic monitoring provides information about bat presence and activity, as well as seasonal changes in species composition, but does not measure the number of individual bats or population density. Acoustic monitoring only records detections, or bat passes, defined as a sequence of two or more echolocation calls, with each sequence or pass, separated by one second or more (Hayes, 1993). Furthermore, there is some question about how much bats use echolocation while migrating as opposed to during foraging or while navigating among obstacles, so caution is necessary when assessing bat use of an area based only on acoustic monitoring data. Passive acoustic surveys can establish baseline patterns of bat activity over the course of a year, but researchers should be aware that with the current state of knowledge about bat-wind turbine interactions, a fundamental gap exists regarding links between pre-permitting assessments and operations fatalities.

Conduct acoustic monitoring at all proposed wind energy sites to determine the presence, ambient activity levels, and the timing of short-term increases in activity (migratory pulses and swarming activity). Collect data on environmental variables such as temperature, precipitation, and wind speed concurrent with the acoustic monitoring so these data can be correlated with bat activity levels. Pre-permitting surveys for bats with acoustic monitors ~~are recommended for at least one year.~~ Year-round surveys provide data on species composition and relative abundance of bats in and near the wind facility, assess migration routes and timing of migration, and help researchers understand seasonal and daily activity levels in relation to proposed wind turbine locations (California Bat Working Group, 2006).

Detectors at ground level do not provide information about bats at the altitude of the rotor-swept area because ultrasound attenuates within tens of meters for many bat species (California Bat Working Group, 2006). Therefore, place bat detection systems at least 100 feet (30 meters) above the ground in multiple locations in the proposed project area (Lausen et al., 2006) and at ground level. Distribute the detectors to cover the project area as completely as possible, at a

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should be developed in consultation with the lead agency and should be based on the presence of bat species of concern at the site.

minimum including monitoring stations at the north, south, east, and west periphery of the project area and one in the center (Lausen et al. 2006). Establish additional stations as needed to encompass diverse terrain or habitats and try to maintain a density of at least 1 to 1.5 acoustic monitoring stations every 1 square mile (2.5 square kilometers). The placement of acoustic monitoring stations will be limited by logistical constraints because stations must either be located where existing meteorological towers are available or along existing roads so that material and equipment to construct temporary towers can be brought to the site. Reynolds (2006) describes information on tower deployment at an eastern U.S. wind development site and also discusses the conduct and results of acoustic monitoring and mist-netting. Reynolds (2006) and Lausen (2006) also provide detailed guidelines for detector deployment and operation. Rainey et al. (2006) provide an in-depth discussion of acoustic monitoring systems.

Acoustic monitoring must be sustained over a full year to capture the considerable night-to-night and seasonal variation in bat use (Hayes, 1997), including pulsed migration events. However, areas characterized by cold winters (higher elevations and portions of northern California) may not need acoustic monitoring during the coldest months when bats are absent. Make decisions on refraining from acoustic monitoring during any portion of the ~~one-year~~ monitoring period only after consulting ~~a bat biologist, CDFG, and USFWS~~ with the lead agency and others recommended by the lead agency.

Some acoustic monitoring systems are designed to run unattended for long periods of time using solar power and collect data passively by storing bat calls for later analysis. Once the detectors have been established on towers, monitor nightly. Analysis of the data, however, can be conducted on a subset of the recordings by making a preliminary screening of the data to look for spikes of activity, with the remainder stored for later analysis if warranted. Make decisions on the level of effort needed for screening and analyzing the pre-permitting acoustic data in consultation with a bat biologist experienced in acoustic analysis.

Other Bat Survey Techniques

Other research tools are available to complement the information from acoustic surveys. The Western Bat Working Group has developed a matrix summarizing recommended survey techniques for western bats <www.wbwg.org/survey_matrix.htm>. The California Bat Working Group (2006) provides information on survey techniques and on potential risk posed by wind turbines to California bat species. (Kunz et al., (in prep.) also provides a comprehensive description of bat survey techniques in relation to wind turbines sites. Biologists with training in bat identification, equipment use, and data analysis and interpretation should design and conduct all studies discussed below. Mist-netting and other activities that involve capturing and handling bats require a permit from CDFG.

Mist-Netting

Bat biologists and experts generally do not consider mist-netting for bats to be an effective method for assessing potential risk to bats at a proposed wind energy site (Kunz et al., in prep.). Mist-netting samples only a small area well below rotor height and must be conducted on no- or low-wind nights (which are rare at wind resource areas) because bats detect and avoid moving nets. However, this capture technique can help assess presence of special-status bat species (for example, western red bats). Mist-netting can obtain information such as species,

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with the lead agency and others recommended by the lead agency.

age, sex, and reproductive status of local bat populations that no other source, short of collecting the bat, can provide. Such information may be relevant in pre-permitting studies if the goal is to evaluate potential project impacts to a local bat population.

Mist-netting and acoustic monitoring are complementary techniques that, used together, can provide an effective means of inventorying the species of bats present at a site (O'Farrell et al., 1999). If mist-netting is to be used to augment acoustic monitoring data at a project site, trapping efforts should concentrate on potential commuting, foraging, drinking, and roosting sites. Methods for assessing colony size, demographics, and population status of bats can be found in O'Shea and Bogan (2003). Kunz et al. (1996) provide detailed guidelines on capture techniques for bats, including mist-nets and harp traps.

Exit Counts / Roost Searches

Pre-permitting survey efforts should include an assessment of known or likely bat roosts in mines, caves, bridges, buildings, or other potential roost sites near proposed wind turbine sites. An exit count can assess the size, species composition, and activity patterns for any bat-occupied features near project areas. An exit count involves a skilled observer watching a bat roost exit at dusk when bats are leaving for their nightly foraging. Exit counts require a skilled observer equipped with a bat detector and call storage system, plus night vision equipment and supplemental infrared illumination. Recording and later viewing of the exodus with one or more properly placed infrared video cameras (with supplemental infrared illumination) can allow a single biologist to cover large structures or abandoned mines with several portals. Rainey (1995) provides a guide to options for exit counts.

Roost searches can also document bat species that are difficult to detect acoustically or with mist-net capture. Roost searches are conducted by looking into or entering potential bat roosts (usually using artificial illumination) with the intent of finding roosting bats or bat "sign," including guano, culled insect parts, and urine staining. Conduct roost searches cautiously because roosting bats are sensitive to human disturbance (Kunz et al., 1996). Never conduct a roost search at known maternity roosts. Searches of abandoned mines or caves can be dangerous and should only be conducted by experienced researchers. For mine survey protocol and guidelines for protection of bat roosts, see the appendices in Pierson et al. (1999).

Radar, Infrared Imaging

During peak bat migratory periods, August through October, researchers may need to augment the information from acoustic monitoring by using radar, near infrared, or thermal imagers (as discussed earlier) that operate beyond the range of acoustic monitors.

Repowering—Pre-Permitting Assessment

Repowering refers to modernizing a wind resource area by removing old turbines and replacing them with new turbines. The new turbines are generally larger, taller, and more efficient than the old. Repowering requires pre-permitting studies using the same methods as those described above for new projects. Some applicable data may be available from the site of the pre-permitting studies of the new turbines. If this information is applied to the repowering project, the ~~developer must be able to demonstrate~~ the lead agency must determine that the studies are recent, credible, and

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the lead agency must determine

CHAPTER 4: ASSESSING IMPACTS AND SELECTING MEASURES FOR MITIGATION

This chapter discusses approaches to assessing impacts to birds and bats that surveys revealed during the pre-permitting phase of wind energy development and to selecting the best measures for avoiding, minimizing, or mitigating those impacts.

Pursuant to CEQA, lead and responsible agencies need estimates of potential fatalities and an assessment of the level of risk to individuals and populations to make determinations of "significance" and to establish impact avoidance, minimization, and mitigation requirements. Assessment of impacts is based on the number of individuals and categories of species at risk, turbine size, design and layout, and the interaction of these attributes with physical factors such as weather and topography.

The information gathered during pre-permitting assessment and the impact analysis evaluated during the CEQA process will also provide an assessment of a project's ability to comply with other state and federal wildlife agency permits besides CEQA requirements. Mitigation at project sites is also essential to ensure that projects will be as consistent as possible with fish and wildlife protection laws.

The chapter is organized into four sections:

- Evaluating and Determining Impacts
- Impact Avoidance and Minimization
- Compensation
- Operations Impact Mitigation/Adaptive Management Measures

Evaluating and Determining Impacts

CEQA lead and responsible agencies categorize impacts into one of three categories: "direct," "indirect," and "cumulative."

Direct Impacts

For purposes of the *Guidelines*, "direct" impacts refer to bird and bat collisions with wind turbine blades, meteorological towers, and guy wires. Potential direct impacts are determined by reviewing all of the pre-permitting data to evaluate which species might collide with turbines and which non-biological factors (such as topographic, weather, and turbine design features) might contribute to this risk. The presence of special-status species using areas that put them at risk may be enough to determine that there are potential impacts. Turbine design characteristics and proposed siting locations are two factors that are known during the impacts analysis and should be considered in assessing potential contribution to risk. Some factors are presented with the understanding that little is currently known about their contribution to fatality risk, so it is incumbent upon biologists making impact determinations to be up to date on the latest research. Operations monitoring from neighboring projects can also provide some

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These assessments can be qualitative and/or quantitative.

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information on potential impacts. To learn of research advances, regularly consult the National Wind Coordinating Committee Wildlife Workgroup Web site, <www.nationalwind.org/workgroups/wildlife/>.

~~**Risk Assessment**~~

~~One tool that other studies have used to assess direct impacts is collision risk assessment. The goal of the risk assessment is to determine whether overall avian and bat fatality rates are low, moderate, or high relative to other projects and to provide measures of overall avian and bat casualties attributable to collisions with wind turbines. Use information on bird and bat use of a proposed wind energy site to perform a qualitative assessment of risks, classified as a Phase I risk assessment (Kerlinger, 2005). A Phase I risk assessment determines whether high bird or bat use might represent a fatal flaw of a proposed project and helps to develop studies to better evaluate risk. The next level of a risk analysis is to make this assessment more quantitative, which involves collecting data on the abundance and spatial and temporal distribution of birds and bats using the site, as well as their behavior and the time birds and bats spend in areas where they might be at risk of collision, and comparing this information to existing data on fatalities at wind resource areas. The "Pre-Permitting Assessment" chapter describes methods for collecting these data. Anderson et al. (1999) and Erickson (2006) discuss the analysis of various types of risk to birds due to wind turbines.~~

~~For all quantification of risk and fatality estimates, use a uniform metric of birds or bats per megawatt (MW) of installed capacity per year to express risk or fatality predictions.~~ ~~Refer to Appendix H for a discussion of raptor use and fatality data from studies at existing wind resource areas.~~

Indirect Impacts

Potential indirect impacts to birds and bats from wind energy projects include disturbance of local populations and subsequent displacement or avoidance of the site and disruption to migratory or movement patterns (NWCC, 2004). To date, displacement and site avoidance impacts have not been evaluated as extensively in California as they have been in other areas. Several studies have been published or are ongoing on the displacement and avoidance impacts of wind turbines and associated infrastructure and activities on grassland and shrub-steppe breeding songbirds and other open country birds (for example, prairie chicken and sage grouse, shorebirds, waterfowl). Some studies have documented decreased densities and avoidance by grassland songbirds and other birds as a function of distance to wind turbines and roads (Leddy et al., 1999; Erickson et al., 2003; Schmidt et al., 2003).

Impacts to movement patterns of waterfowl and shorebirds have been a concern in many western European countries where offshore wind farms are in the pathway of daily commutes of seabirds (Guillemette et al., 1999; Dirksen et al., 2000). A few studies have looked at the relationship between nest occupancy and placement of turbines (Howell and Noone, 1992; Hunt et al., 1999; Hunt, 2002; Erickson et al., 2003) and have documented relatively few impacts. Most of these studies do not conclusively establish that a reduction in use of an area is due to avoidance (indirect impact) versus the reduction in a local population due to collisions with turbines (direct impact).

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seasonally breeding, migratory, or wintering and whether it is stable, increasing, or decreasing. The assessment should include a discussion of natural and anthropogenic factors contributing to population trends.

2. Establish an appropriate geographic scope for the analysis and provide a reasonable explanation for the geographic limitation used. The geographic scope of the analysis will generally include a larger area than the project site.

3. Compile a summary list of past and present projects and projects in the reasonably foreseeable future within the specified geographical range that could impact the species, including construction of transmission lines and other related wind energy project infrastructure. The list of projects should include other wind generation projects as well as other projects that may involve habitat loss, collision fatalities, or blockage of migratory routes that could impact species under consideration. The project summary should describe the environmental impacts of each individual project on the species and provide the reader with references for information about other projects.

4. Assess the impacts to the relevant bird or bat species from past, present, and future projects. The analysis should make use of population trend information and regional analyses that are available for the species. Make determinations of population viability and the contribution of the project to the cumulative impact. If, after thorough investigation, the impact is considered too speculative for evaluation, state that conclusion, and the cumulative impact assessment can be terminated (CEQA Guidelines §15145). The lead agency needs to identify facts and analysis supporting any conclusion that the cumulative impact is less than significant.
5. Identify the impacts and impact avoidance, minimization, or mitigation measures to the species, and make a determination regarding the significance of the project's contributions to cumulative significant impacts. The significance determination should include an evaluation of the cumulative impacts the project and neighboring projects might have on the local or regional species population or the species as a whole. For some projects, the only feasible mitigation for cumulative impacts may involve the adoption of ordinances or regulations or implementation of a regional mitigation plan, rather than the imposition of conditions on a project-by-project basis.

Impact Avoidance and Minimization

The most important decision regarding impact avoidance and minimization comes early in site screening, often prior to stakeholder input. If a site is developed despite indications that substantial bird or bat fatalities might result, problems can continue throughout the life of the project. As discussed in previous chapters, compliance with state and federal laws requires both avoidance and minimization of project impacts. Avoidance is best applied during pre-permitting site selection (macrositing) and during site layout planning (micrositing). Good macrositing decisions are essential for choosing an acceptable site or portion of a site.

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This section only briefly discusses qualitative approaches and does not discuss Phase 2 or Tier 2 quantitative approaches. Again, this type of analysis will influence the choice of pre permitting monitoring and operational monitoring.

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IMPACT ASSESSMENT APPROACHES

Risk Assessment [move down from above and edited]
One tool that other studies have used to assess direct impacts is collision risk assessment. The casualties attributable to collisions with wind turbines. Use information on bird and bat use of a proposed wind energy site to perform a qualitative assessment of risks, classified as a Phase I risk assessment (Kerlinger, 2005). A Phase I risk assessment determines whether high bird or bat use might require more detailed studies and potential impact mitigation by a proposed project and helps to develop studies to better evaluate risk. The next level of a risk analysis is to make this assessment more quantitative, which involves collecting data on the abundance and spatial and temporal distribution of birds and bats using the site, as well as their behavior and the time birds and bats spend in areas where they might be at risk of collision, and comparing this information to existing data on fatalities at wind resource areas. The "Pre - Permitting Assessment" chapter describes methods for collecting these data. Anderson et al. (1999) and Erickson (2006) discuss the analysis of various types of risk to birds due to wind turbines.

For all quantification of risk and fatality estimates, use a uniform metric of birds or bats per megawatt (MW) of installed capacity per year to express risk or fatality predictions. Refer to Appendix H for a discussion of raptor use and fatality data from studies at existing wind resource areas.

reasonable detail how the wind turbines and associated structures will be dismantled and removed.

Decommissioning a project typically involves removal of turbine foundations to three feet (one meter) below ground level and removal of access roads, unnecessary fencing, and ancillary structures. The decommissioning plan should also include documentation showing financial capability to carry out the decommissioning and restoration requirements, usually an escrow account, surety bond, or insurance policy in an amount (approved by the lead agency) sufficient to remove the wind turbines and restore the site.

Compensation

Compensation is a common way to mitigate or offset impacts, including cumulative impacts that cannot be avoided or minimized in other ways. Although impacts still occur, the ability to compensate for them can determine whether a project is delayed, approved in a timely manner, or not approved at all. Feasible compensatory mitigation is mandated by CEQA if it will serve to mitigate a project's effect on the environment to less than significant. Given that all wind energy projects impact bird and/or bat species to some degree, compensatory mitigation will likely be needed at most wind energy facilities to offset the impacts of wind energy development.

The CEQA lead agency makes the decision on exactly which compensation measures shall be required to mitigate for a project's impact. Compensation amount and metrics are site- and species-specific and must be formulated for each individual project. Compensation should have a biological basis for ensuring protection or enhancement of the species affected by the project. Development of effective compensation measures should involve the CEQA lead agency, project proponent, wildlife agencies, and the affected public stakeholders, through the CEQA process. Lead agencies should establish the general terms and funding commitments for compensation prior to issuing final project permits so project developers have some assurance of their mitigation costs and monitoring commitment for the life of the project. Triggers for additional compensatory mitigation beyond that required at project approval should be well defined and feasible to implement, so the permittee will have an understanding of any potential future mitigation requirements.

Compensation required as project mitigation must be monitored for success by the lead agency pursuant to a CEQA mitigation monitoring plan. When a permit is required from CDFG or USFWS, compensatory mitigation must satisfy those permit conditions to fully mitigate a project's effect on listed species.

The following potential compensation options are known to protect and enhance bird and bat populations at biologically appropriate locations when properly designed and implemented:

- Offsite conservation and protection of essential habitat
  - Nesting and breeding areas
  - Foraging habitat

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Alternatively, counties can obligate property owners to decommission non-operational projects.

Regardless of the form of the compensatory mitigation, the permitting agency should establish a nexus between the level of impact and the amount of mitigation. Unlike habitat impacts, in which an acre of habitat loss can be compensated with an appropriate number of acres of habitat protected or restored, bird and bat collisions with wind turbines are impacts that do not suggest an obvious compensation ratio. Collision impacts take place in airspace rather than over a specified acreage of land and are chronic impacts occurring each year. The impacts can extend well beyond the local environment because the affected birds and bats are often migratory and far ranging, sometimes coming from out of state or out of country. Finally, fatalities can vary greatly between project sites and from year to year. Under these circumstances, it is difficult to identify acreage of land that offers compensation value for some quantity of bird or bat fatalities.

Given the nature of impacts to birds and bats from turbine collision, permitting agencies must consider compensation alternatives to a simple acreage ratio. The level of compensation should be biologically based and reasonable and should provide certainty in terms of the funds that will be expended over the life of the project and certainty that the mitigation will continue to provide biological resource value over that same period. Consult the wildlife agencies and species experts in development of the ratios and fees to be used in establishing these compensation formulas because all of these methods require some forecasting of impacts over the life of the project based on pre-permitting studies.

Operations Impact Mitigation and Adaptive Management

Operations impact mitigation and adaptive management generally occur only if the level of fatalities at a project site was unanticipated when the project was permitted, and therefore, measures included in the permit are inadequate to avoid, minimize, or compensate for bird or bat fatalities. Once a project is operating, it is difficult to modify turbine site layout, and operations impact avoidance, minimization, and mitigation options are limited. Developing contingencies and plans to mitigate high levels of unanticipated fatalities becomes even more important when choices for operational impact avoidance or minimization are so limited. To avoid open-ended conditions that are difficult for developers to include when planning for project costs and timing, establish minimization measures and compensatory mitigation that could be needed for unexpected impacts as well as the thresholds that will trigger these actions. Determine these measures and compensatory mitigation before permits are issued.

In extreme cases, additional compensation may not be adequate for high levels of unanticipated impacts, and project operators may need to consider operational and facility changes. The adaptive management process recognizes the uncertainty in forecasting impacts to birds and bats and allows testing of options as experiments to achieve a goal and determine impact avoidance, minimization, and mitigation effectiveness. These options include maintenance activities or habitat modification to make the site less attractive to at-risk species and seasonal changes to cut-in speed. During the bat migratory period, limited and periodic feathering of wind turbines during low-wind nights may help avoid impacts to bats. If multi-year monitoring documents high levels of fatalities, removal of problem turbines or seasonal shutdowns of turbines may be options if other minimization measures are ineffective in reducing fatalities.

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This can only be accomplished with an appropriate impact analysis which in turn influences pre-permitting and operational monitoring methods. Pare this section down significantly.

CHAPTER 5: OPERATIONS MONITORING AND REPORTING

This chapter describes the standardized techniques recommended for collecting, interpreting, and reporting post-construction operations monitoring data. The rationale for operations monitoring at wind turbine sites is to collect bird and bat use and fatality data and compare it to impact estimates from the pre-permitting studies and other wind energy facilities. This information is required to evaluate, verify, and report on compliance and effectiveness of CEQA avoidance and minimization measures and to document compliance with other applicable permit requirements. At a minimum, the primary objectives for operations monitoring are to determine:

- If estimated fatality rates described in permit conditions were reasonably accurate;
- If the avoidance, minimization, and mitigation measures implemented for the project were adequate, or if additional corrective action or compensatory mitigation is warranted.
- Whether overall bird and bat fatality rates are low, moderate, or high relative to other projects.

On a larger scale, monitoring informs the development of new wind energy facilities in California with project-specific fatality data that will improve pre-permitting estimates on other future projects. Collected in a consistent manner, monitoring data will provide insight into the occurrence, magnitude, and reasons for bird and bat fatalities and will fine tune the development of avoidance, minimization, and mitigation measures for wind energy projects throughout the state.

Operations monitoring typically consists of ongoing bird and bat use surveys and counts of bird and bat carcasses in the vicinity of wind turbines. The number of carcasses counted during operations monitoring is an underestimate of the birds and bats actually killed by wind turbines for several reasons. Searchers will inevitably miss some of the carcasses. In addition, some carcasses may disappear due to scavenging or be destroyed by farming activities such as plowing. Some birds and bats also may not be counted because they are injured by turbines and fly or hop out of the search area. Most fatality estimates reported for wind energy projects are therefore extrapolations of the number of fatalities with corrections for sampling biases. The methods described below are recommendations for protocols to conduct bird and bat use surveys and carcass counts, quantify and correct for the inherent biases in carcass counts, and analyze and report the data.

The duration of operations monitoring should be sufficient to determine if pre-permitting estimates of impacts to birds or bats were reasonably accurate and to determine if turbines are causing unanticipated fatalities that require impact avoidance or mitigation actions. In most situations, two years of operations monitoring is needed so that carcass counts and bird and bat use data can be collected in spring, summer, fall, and winter and capture variability between years. If pre-permitting studies indicate high potential for impacts to birds or bats and considerable seasonal or annual variation in bird or bat use, a longer operations monitoring

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Therefore, it is necessary that there be consistency between monitoring conducted during pre-permitting and operational monitoring. It is also important to recognize that unless operational monitoring demonstrates some significant deviation from the pre-permitting assessment of impacts, more detailed monitoring and analysis should not be required as a part of project conditions. More detailed monitoring could be conducted, outside of permit conditions, to answer research questions that may have broader value outside the operation of a particular site.

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(including consistently with pre-permitting protocols)

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This and other types of monitoring may have research value.

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CHAPTER 5: OPERATIONS MONITORING AND REPORTING

This chapter describes the standardized techniques recommended for collecting, interpreting, and reporting post-construction operations monitoring data. The rationale for operations monitoring at wind turbine sites is to collect bird and bat use and fatality data and compare it to impact estimates from the pre-permitting studies and other wind energy facilities. This information is required to evaluate, verify, and report on compliance and effectiveness of CEQA avoidance and minimization measures and to document compliance with other applicable permit requirements. At a minimum, the primary objectives for operations monitoring are to determine:

- If estimated fatality rates described in permit conditions were reasonably accurate.
- If the avoidance, minimization, and mitigation measures implemented for the project were adequate, or if additional corrective action or compensatory mitigation is warranted.
- Whether overall bird and bat fatality rates are low, moderate, or high relative to other projects.

On a larger scale, monitoring informs the development of new wind energy facilities in California with project-specific fatality data that will improve pre-permitting estimates on other, future projects. Collected in a consistent manner, monitoring data will provide insight into the occurrence, magnitude, and reasons for bird and bat fatalities and will fine tune the development of avoidance, minimization, and mitigation measures for wind energy projects throughout the state.

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The duration of operations monitoring should be sufficient to determine if pre-permitting estimates of impacts to birds or bats were reasonably accurate and to determine if turbines are causing unanticipated fatalities that require impact avoidance or mitigation actions. In most situations, two years of operations monitoring is needed so that carcass counts and bird and bat use data can be collected in spring, summer, fall, and winter and capture variability between years. If pre-permitting studies indicate high potential for impacts to birds or bats and considerable seasonal or annual variation in bird or bat use, a longer operations monitoring

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study may be required to determine if pre-permitting estimates of fatalities are accurate, if mitigation is working, and if further operations monitoring is warranted. Conversely, minimal operations monitoring would be suitable for a project in which pre-permitting studies indicated that impacts were likely to be low, or if the proposed project is adjacent to an established and well-studied wind farm that had credibly demonstrated minimal levels of impacts to birds and bats. Reduced monitoring during the second year might be appropriate if the first year of monitoring provides scientifically defensible data documenting low fatality rates and if data from use counts indicate that annual variability is low. For all proposed projects, consult the CDFG, USFWS, and other knowledgeable scientists and appropriate stakeholders regarding study protocol and the duration of an operations monitoring program.

Upon completion of ~~two years of~~ operations monitoring, CDFG, USFWS, and other scientists and stakeholders who were involved in developing the operations monitoring protocol should assess whether continued, long-term monitoring of fatalities is warranted. Long-term monitoring on a periodic basis (for example, every five years) for the life of the project should occur if operations monitoring data or other new information suggests that project operation is likely to result in substantial impacts to birds or bats that were unanticipated and unmitigated during permitting of the project. Factors to consider in assessing the potential for unanticipated impacts include changes in bird and bat use of a site due to changes in habitat conditions or shifts in migratory and movement patterns that are a result of climate change and that might affect collision risk. Such long-term monitoring could be coordinated with larger regional studies within the entire wind resource area.

Operations Monitoring for Repowered Sites

Operations monitoring for repowering projects will be similar to other wind energy projects, and will be based on pre-permitting site screening and monitoring results. Additional fatality and use data that can augment the new data collection efforts may also be available from nearby existing wind facilities. Generally, standardized protocol monitoring should be conducted to determine operations fatality levels for birds and bats and whether the levels are approximately those estimated during pre-permitting assessment. The discussions in this chapter pertain to repowering projects as well as other wind energy projects.

Determining Bird and Bat Abundance and Behavior During Operations

Data on bird and bat abundance and site use should accompany all fatality studies at wind energy project sites. Bird and bat use surveys characterize bird abundance, flight, and perching behavior and bat use in and around turbines, as well as topographic features of the site. Conduct standardized surveys, as described earlier in the "Pre-Permitting Assessment" chapter, to allow for comparisons of data before and after the project and with other projects.

For operations monitoring of bats, ~~two years of~~ acoustic monitoring is recommended if CDFG, USFWS, and other knowledgeable scientists and appropriate stakeholders consider this information a necessary adjunct to the bat fatality data. The acoustic monitoring will determine ambient levels of bat activity following the commencement of operation, particularly during

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migration. Collect data on environmental and weather variables concurrently with the bat activity data collection. The pre-permitting surveys should have indicated which seasons are of particular concern for potential impacts to bats and which times of the year may warrant more intensive bat and bird monitoring (for example, from July through October when many bat species are migrating). The methods should be consistent with those used during pre-permitting studies, and the study design should be confirmed in consultation with CDFG, USFWS, and other scientists and stakeholders who were involved in developing the pre-permitting studies. Kunz (2004), Kunz et al. (in prep), and the California Bat Working Group (2006) provide a discussion of post-construction survey methods for bats.

Carcass Searches

Establishing Carcass Search Plots

Establish search plots at approximately 30 percent of the turbines. The turbines to be sampled can be selected at random, via stratification, or systematically as long as the selection process is scientifically defensible. The dimensions of carcass search plots will vary depending on turbine size and configuration and characteristics of the site. The search area should have a width equal to the maximum rotor tip height. For example if the rotor tip height were 400 feet (120 meters), the search area would extend out 200 feet (60 meters) from the turbines on each side. The search area may be a rectangle, square, or circle depending on turbine locations and arrangements. If the site is steep, extend the search area on the downhill side because carcasses could fall farther from the turbine. In studies where bats are the sole focus of the search, the search radius can be smaller than for large birds and raptors. Studies conducted at other wind energy facilities indicate that most bat fatalities (more than 80 percent) typically are found within half the maximum distance from the turbine tip height to the ground (Kerns et al., 2005).

Surveyors can select a search area that does not encompass 100 percent of the carcasses, as indicated by pilot searches or incidental observations of carcasses outside the search area. However, surveyors must quantify that source of error, make corrections in the final calculation of fatalities, and disclose that information in the monitoring report. Surveyors should establish a search area that includes approximately 80 percent or more of the carcasses.

Another source of error in carcass counts is crippling bias, the undercounting that occurs because some birds or bats might be injured by turbines and move outside of the search area. Accounting for crippling bias is difficult. This document does not provide recommendations for methods to estimate crippling bias because such attempts in previous studies produced relatively little relevant data per unit time of effort (EPRI et al., 2003).

Conducting Searches

Carcass search and bird and bat use data provide an estimate of the number of bird and bat deaths attributable to collisions with wind turbines or meteorological towers. Locate carcasses by using trained and tested searchers who walk the search area in either linear or concentric circle transects around the turbine. This document recommends a standard transect 20 feet (6 meters wide), 10 feet (3 meters) on either side of a centerline (the searcher looking at three

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